STATUS OF THE SUPERCONDUCTING SUPER COLLIDER PROGRAM

HEARING

BEFORE THE

SUBCOMMITTEE ON
INVESTIGATIONS AND OVERSIGHT

OF THE

COMMITTEE ON
SCIENCE, SPACE, AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES

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STATUS OF THE SUPERCONDUCTING SUPER COLLIDER PROGRAM

THURSDAY, MAY 9, 1991

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:33 a.m., in room 2226, Rayburn House Office Building, Hon. Howard Wolpe (Chairman of the subcommittee) presiding.

Mr. WOLPE. The subcommittee will come to order. Good morning. Today the Subcommittee on Investigations and Oversight will receive testimony from the General Accounting Office and the Department of Energy on the status of the Superconducting Super Collider Program.

Today's hearing is the beginning of an ongoing examination of the SSC Program. Vigorous oversight of this program is required for three major reasons.

First, last fall's bipartisan budget summit agreement has changed the rules of the game. Now all non-defense discretionary spending programs must compete for scarce Federal resources. Every dollar spent on this program will be a dollar that is not available for educating our children, protecting the environment, retraining our work force, or rebuilding the public infrastructure. In light of the multi-billion dollar price tag on this program, Members of Congress must carefully weigh the merits of this project and the costs to other worthy programs that will be underfunded as a result. We hope that our oversight activity in this area will lead to a more informed decision making process.

Second, the new budget process has created the same competition among Federal science and technology programs. There is growing concern that valuable "small science" activities will be severely curtailed by a few capital intensive "big science" programs.

And third, if Congress determines this program should go forward, it is the responsibility of this subcommittee to closely oversee the program to ensure maximum return in scientific knowledge at the lowest cost to the American taxpayer.

The SSC is a project of enormous size and technical complexity. Unfortunately, the way it is being presented to Congress, there appears to be only two stages: too soon to tell and too late to stop. We are being asked to commit huge sums of money up front, before we have a good fix on whether this project can be built at the cost and schedule advertised. All we have right now are assurances from

DOE. And given the fact that their cost estimates for the project have already risen from $5.3 billion to $8.2 billion, that agency doesn't have much credibility to fall back on.

That is why we have initiated this review of the program. In order for Congress to make a responsible decision about this enormous undertaking, and weigh it against competing interests, we must understand what the full costs of the project are, what major obstacles confront the program, and how the Department is prepared to resolve those problems and make this program work.

Unfortunately, I am very uncomfortable with the answers we have received as a result of our investigation to date. I don't believe that DOE and its contractor have put into place the framework necessary for success. As a result, I have a number of major concerns:

The total taxpayer cost of this project will be much higher than the $8.2 billion total project cost that DOE currently projects. As a result, Congress can't accurately weigh the costs and benefits of the project.

Internal administration memos obtained by the subcommittee reveal that the prospects for the Department fulfilling its pledge to obtain $1.7 billion in foreign contributions are virtually non-existent.

The project contractor has not established the administrative and organizational framework that is needed to ensure success. Already, important milestones have slipped. Important administrative systems necessary to plan and organize a major undertaking of this nature are still not in place.

The Department of Energy has once again saddled itself with a contract that leaves it no handle to control the contractor responsible for this multi-billion dollar undertaking.

Finally—and most importantly—DOE has devised what it terms a "success oriented" approach that could be a formula for disaster. It has set a very short time frame for the accomplishment of some very difficult tasks and the resolution of some complex technical questions. For example, significant uncertainties still surround the development of the superconducting magnets. And all elements of the project schedule are so tightly wound together that one slip or mistake could cascade into long and expensive delays. In other words, this inflexible approach has not made any contingency for unanticipated problems or complications, which could cause project costs to climb even higher.

It is incumbent upon the Department to prove that this project can succeed. On the basis of what we have seen to date, it's not making a good case. I look forward to the Department's testimony this morning.

As I indicated, our interest in this matter will not end with today's hearing. We plan an ongoing review of this program. Shortly, I will be requesting GAO to review a number of issues related to this program, primarily related to foreign contributions and the development of the superconducting magnets.

[The prepared opening statement of Mr. Wolpe follows:]

News *from*
Congressman
HOWARD WOLPE
3rd District, Michigan

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OPENING STATEMENT OF REP. HOWARD WOLPE

May 9, 1991

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As I indicated, our interest in this matter will not end with today's hearing. We plan an ongoing review of this program. Shortly, I will be requesting GAO to review a

number of issues related to this program, primarily related to foreign contributions and the development of the superconducting magnets.

I would now like to recognize the Ranking Republican on the Subcommittee, my good friend from New York, Rep. Sherry Boehlert.

Mr. WOLPE. I'd like now to recognize the Ranking Republican Member of this subcommittee, my good friend from the State of New York, Mr. Sherry Boehlert.

Mr. BOEHLERT. Thank you very much, Mr. Chairman.

I received an interesting letter yesterday from Secretary Watkins complaining about a GAO report on the super collider. In his letter the Admiral argued that reports on the SSC—and I quote—"should provide the Congress with a complete and unbiased picture of the issues and a full set of facts that are pertinent to the concerns of the Congress and the decisions it faces."

I couldn't agree more. Perhaps today the Department will live up to its own standard. It would be the first time. For up until now, the Department's communications have consisted of nothing more than clever evasions, wishful thinking, erroneous arithmetic, broken promises and outright lies. Sad to say, that pattern continued in the very letter in which Secretary Watkins complained about GAO's behavior.

No scientific peer review panel would ever approve a project on the basis of the kind of shoddy data DOE has presented to the Congress.

And now that we've gone through all the documents, the reason for all the dissembling and disingenuous presentations becomes clear. It's the usual reason. The actual facts don't add up to the case the Department needs to make to build the project.

The Department would like the Congress to believe that the SSC is an affordable project with few uncertainties remaining related to its management, construction or cost. Our investigation will show that the project can claim none of these attributes. The project's costs continue to be grossly underestimated and its practical benefits exaggerated. The project will swallow up the Nation's already limited science budget, forcing a round of "beggar thy neighbor's" scientific discipline.

None of these conclusions should have come as a surprise. They fit with the pattern of broken promises already established by DOE. To take just the most recent example—the Department pledged last year that the superconducting super collider would not cost the Federal Government more than $5 billion. The Federal price tag this year? $5.6 billion, according to the Department's own estimates, based on DOE's imaginatively low total cost estimate and imaginatively high guess about foreign contributions.

With this sort of record, I no longer see how we can possibly proceed with this project.

Probing the secrets of the universe is going to have to wait until we can be sure we have probed the secrets of SSC.

Thank you, Mr. Chairman.

[The prepared opening statement of Mr. Boehlert follows:]

CONGRESSMAN SHERWOOD BOEHLERT (R-NY)
OPENING STATEMENT
SUPERCOLLIDER INVESTIGATION
May 9, 1991

Mr. Chairman:

I received an interesting letter yesterday from Secretary Watkins complaining about a GAO report on the Supercollider. In his letter, the Admiral argued that reports on the SSC (and I quote) "should provide the Congress with a complete and unbiased picture of the issues and a full set of facts that are pertinent to the concerns of the Congress and the decisions it faces."

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With this sort of record, I no longer see how we can possibly proceed with this project.

Probing the secrets of the universe is going to have to wait until we can be sure we have probed the secrets of the SSC.

Thank you.

Mr. WOLPE. Thank you very much, Mr. Boehlert.

May I ask if any other Member would care to make an opening statement?

Mr. Geren?

Mr. GEREN. Thank you, Mr. Chairman. I want to thank you for holding this hearing and giving us the opportunity to examine this very important project.

This is a project that is on time, on schedule, and under budget. And I am pleased to report to you today the results of the reports I have received and of discussions I have had with executives of the Super Collider Laboratory regarding the project status. The news I bring is good.

Let me recount the progress since the first members of the Super Collider Advanced Party arrived in Dallas early in 1989.

The Super Collider's design parameters have been set and the entire machine has been fitted to its site in Ellis County in Texas.

Laboratories submitted the detailed cost estimate at the end of 1989, barely 10 months after it set up operations in Dallas. The estimate underwent a year of scrutiny by the Department of Energy and independent panels, the review was thorough and the estimate has been found highly credible. If Congress provides the annual funding in accordance with the estimate schedule, there is every reason to have confidence that the super collider will be completed on time and within its estimated cost.

An outstanding executive team has been assembled at the laboratory with the right combination of achievement, talent, and experience for successful implementation of this project. Total employment now stands at nearly 1,100 people.

Crucial improvements have been made in the design of the critically important superconducting magnets which guide and focus the accelerator beams. Improved prototypes of the dipole magnets which steer the beams have been tested with great success at three laboratories, including the Japanese High Energy Physics Laboratory at Zacuba City, Japan.

Industrial partners have joined the laboratory team. General Dynamics in Louisiana and Westinghouse in Florida have been selected to produce the dipole magnets, and an outstanding team has been put together to do the design and the construction.

On April 29th an advance party of executives, engineers, and managers of General Dynamics Corporation arrived at the Fermi National Accelerator Laboratory in Illinois to begin the transfer of the super collider superconducting magnet technology to American industry.

In preparation for the scientific program, with its great promise of discovery, more than 90 universities and institutions in 30 States have received contracts for super collider research, totalling more than $100 million. This is small science at its best and most productive; individual investigators in many universities, each contributing important advances to man's knowledge and know how, yet all part of a greater enterprise of fundamental discovery.

Mr. Chairman, two presidents have endorsed the super collider. People of the State of Texas voted two to one to invest $1 billion of our own money toward its cost. The Congress has twice appropriated funds and last year the House voted overwhelmingly to au-

thorize the project, for it is clear that it is in our national interest to do so.

We know the issues of cost, schedule, magnet production, international participation and program management may be raised here today. It is my hope that the issues discussed will be examined in an objective and careful manner. And I hope that we will bear in mind that SSC is not over budget, rather what we are addressing here today is a review of the overall program and its anticipated cost.

Every indication I have tells me that we can meet the goals we have established for this unprecedented scientific endeavor. I have confidence in the team we have assembled and I believe it is vital that we continue to move forward on this important national project.

Mr. Chairman, at the beginning of your remarks, you said that every dollar spent on this program will, will be a dollar that is not available for educating our children, protecting the environment, retraining our work force or rebuilding the public infrastructure.

There is nothing more important to the future education of our children than making sure we maintain the technological edge in this world, in research, in science and research.

There is nothing more important in protecting the environment that we can do than invest in scientific research. The great advances in environmental technology have come from our country because we have made investments in pure science.

Retraining our work force, there's nothing that we can do more important to ensuring that the workers of America maintain the edge that ensures the quality of life and standard of living that we have, than investing in the future for those workers.

And certainly, when we talk about the infrastructure of this country, when we look at our Nation's future, the scientific infrastructure of this future—of our country—is going to do more to determine what kind of a world we leave for our children than any other type of investment we can make.

Mr. Chairman, thank you for holding this hearing and thank you for letting me make my remarks.

Mr. WOLPE. Thank you very much, Mr. Geren.

Mr. Sensenbrenner?

Mr. SENSENBRENNER. Thank you very much, Mr. Chairman. I'll be very brief.

At the time the full committee on Science and Technology—last year—sent the SSC authorization bill to the floor, there was a commitment made that the total Federal contribution for the construction of the SSC would not exceed $5 billion. And that was the premise upon which the legislation was passed by the House of Representatives.

There also was a specific provision in that law that requires that not less than 20 percent nor more than 33 1/3 percent of the total cost of the SSC be contributed from foreign sources—and of course, the State of Texas has pledged a billion dollars of State money for SSC and SSC related costs.

What disturbs me particularly, is the current estimate that the Federal share of the SSC would be $5.6 billion. I am afraid that

once the $5 billion Federal cap that was set by the Committee last year is breached, we are well on the road to a bottomless pit.

And I would hope that the witnesses before us today, particularly those from the Department of Energy, would address themselves to the fact that a deal appears to have been broken, and perhaps advise us how we should react to the fact that the deal appears to have been broken.

Thank you.

Mr. WOLPE. Thank you very much, Mr. Sensenbrenner.

Mr. Thornton?

Mr. THORNTON. Mr. Chairman, I also want to congratulate you on scheduling this important oversight hearing and to suggest, as my colleague from Texas has mentioned, that investments in scientific research are often the driving force for economic advances for our society. That however does not mean that we should not proceed carefully and with judgment as we move along that course.

If at the end of World War II and just prior to the development of transistors, the United States had set out to build a huge computer, using vacuum tubes, condensers, and resistors—the electronic capability of that time—to construct a suitable computer would have been an enormous undertaking, requiring huge buildings to house the facilities. It would have been very expensive and it would have accomplished little more than is now done in a hand-held computer, using the advances that have come in technology and in science.

I want to submit to the appropriate people, a series of questions as to whether the advances in super conductivity are being considered in connection with the magnets, which are being designed for this facility.

It would seem to me that it would make much more sense to use super conducting materials which can operate at liquid nitrogen temperatures than those which require liquid helium. It is much more expensive. It is much less dependable.

And I think that it would be very important to make sure that the advances in science, which are emerging rapidly in superconducting materials, be considered as we put cost estimates. It would seem to me to be a terrible thing if we invested huge sums of money in a series of helium cooled superconducting magnets, if that technology is going to pass by that, that kind of material.

And I will want to pursue some questions on that and on other things.

Again, I congratulate you for scheduling this series of hearings.

Mr. WOLPE. Bill, thank you very much, thank you.

Mr. BARTON. Mr. Chairman——

Mr. WOLPE. Yes?

Mr. BARTON [continuing]. May I ask a question of the Chair?

Mr. WOLPE. Sure, surely.

Mr. BARTON. I know that I'm not a Member of the Oversight Subcommittee, but in conversations with the Ranking Republican, Mr. Walker, and the Minority staff, I have been informed that I will be able to participate, other than asking questions. Is that your understanding?

Mr. WOLPE. Oh, oh, surely. My only—the only constraint is that Members of the subcommittee must conclude their questions first.

Mr. BARTON. I understand.

Mr. WOLPE. But I welcome your presence here and I'm delighted to have you here.

Mr. BARTON. May I make a very short opening statement?

Mr. WOLPE. Surely.

Mr. BARTON. Mr. Chairman, first of all I want to thank you for your courtesy.

There's an old saying that we've all heard, that beauty is in the eyes of the beholder. Obviously, some of us think the SSC is a very beautiful project, some of us think that it has a few warts. And it is the intent of this subcommittee to try to investigate the warts and to see just how serious they are. I welcome that.

I think that the Department of Energy, the official SSC laboratory, all the various subcontractors and contractors are all so very willing to come before you and the other members of this subcommittee and answer your questions honestly and forthrightly.

I would point out that in preparation for this hearing, the Department of Energy and the laboratory have forwarded over 50 boxes of material. They estimate that it has taken somewhere between $500,000 and $750,000, if you include the material and the man-hours, to present the material that your staff is so diligently going through.

And they feel that they've put in about 10,000 hours in man-hours in attempting to give you the information that you've requested, so I don't think anybody is trying to hide anything. I think that we do want to get to the bottom of the concerns. And quite frankly, I think some of the concerns you've expressed are serious.

I would like to read one paragraph from the ICE Cost Estimate Report—it's dated September, 1990—that might alleviate some concern. It says, "The SSC project has been subjected to intense scrutiny, primarily because of the controversy surrounding its cost. In addition to the HEPAP" — which is High Energy Physics Advisory Panel review referenced above, and this was a review that was conducted in December of 1989—it says, "major energy research reviews were conducted in September, 1989, January 1990, and June 1990. HEPAP subcommittee also reviewed the SSC program in June 1990. Both the ER review and the HEPAP review held in June 1990, placed extraordinary emphasis on the project cost estimate."

So, the people that are running the program are doing everything possible to make sure that the program is under budget. And I think if we focused on what has actually been done to date, and the actual result, you will see that SSC is a project that we can be proud of. With that, I, I again thank you for your consideration.

Mr. WOLPE. Thank you very much, Mr. Barton. I have a hunch that there's some of the same creativity involved in the cost estimates you just mentioned, as you, we, have discovered in the course of the SSC projections, but we'll get into that down the road.

I'd like at this point to introduce our first witness Judy England-Joseph, the Associate Director for the Resources, Community and Economic Development Division of the General Accounting Office. She's accompanied by Mr. Sumikatsu Arima and then Ms. Ilene Pollack.

As you know, in order not to prejudice any past or future witnesses, it has been the policy of the subcommittee to swear all witnesses in. Does anyone who will be testifying have any objections to being sworn in?

[No response.]

Mr. WOLPE. If not, would you all please stand and raise your right hand?

[Witnesses sworn.]

TESTIMONY OF JUDY ENGLAND-JOSEPH, ASSOCIATE DIRECTOR RESOURCES, COMMUNITY AND ECONOMIC DEVELOPMENT DIVISION, GENERAL ACCOUNTING OFFICE, ACCOMPANIED BY SUMIKATSU ARIMA AND ILENE POLLACK

Ms. ENGLAND-JOSEPH. Mr. Chairman and members of the subcommittee, it's a pleasure to be here today to discuss the status of the Department of Energy's Superconducting super collider. I'd like to summarize my remarks and submit my entire statement for the record.

My testimony will focus on the approach DOE and the SSC laboratory are using to develop and industrially produce superconducting magnets for the SSC, including the following points:

Although superconducting magnets for an accelerator have been industrially produced once, whether the DOE and SSC lab will have similar success, is uncertain, because they are taking a different approach to develop and produce the magnets for a substantially larger accelerator. Full-sized, superconducting, collider dipole magnets for the SSC's current design have not yet been built or tested, and a significant risk remains that the magnets may not work as intended. The development schedule for these magnets is compressed and as such, increases the risk that the magnets will not work as intended because little time has been allowed to resolve any problems that may be encountered.

Germany's experience with building an accelerator called the Hadron Electron Ring Accelerator, otherwise known as HERA, shows that superconducting magnets can be industrially produced. German officials attribute their success at having industry produce the superconducting magnets to four factors:

One, one person at the German laboratory had the authority and the knowledge needed to make all decisions concerning the technology, budget, and schedule for the magnets;

Two, the laboratory clearly identified the specifications for the industrially produced magnets before bids were requested;

Three, the laboratory retained the flexibility to negotiate with the contractor by maintaining ownership of the tooling and the technology; and

Four, the German laboratory fully measured and tested each magnet before accepting and installing it into the accelerator ring.

The SSC laboratory has approached these factors differently in developing and producing superconducting magnets. The SSC laboratory relies primarily on other DOE laboratories' technical expertise with superconducting magnets.

The laboratory requested bids from industry to build magnets before building or testing a prototype magnet.

The laboratory retains ownership of the tooling and technology, but is allowing one contractor to take the lead in the design and development of tooling and techniques for producing these magnets.

And finally, the SSC laboratory plan to rely on the contractor to measure the magnets at the plant and to cold test about 19 percent of the magnets before they are installed in the collider's tunnel.

The most obvious difference between the HERA and SSC projects is that the HERA project was built at an existing accelerator facility while the SSC project, as you know, is starting at a new location where no pre-existing accelerator exists. Therefore, Germany was able to focus most of its accelerator construction efforts on the additional requirements of the HERA.

In comparison, DOE and the SSC Laboratory have had to concern themselves with constructing the entire SSC collider, accelerator, as well as establishing and building the laboratory itself.

The SSC laboratory has not yet built or tested full-size 50-millimeter collider dipole magnets. Because of the December 1989 change in design from a 40-millimeter to a 50- millimeter aperture, the tooling for building these magnets only recently became available. Fermi Lab, which has a lead role in developing the magnets, received the tooling for the full-sized 50-millimeter magnets in April of this year and only recently began to build the first full-sized 50-millimeter magnets.

The magnet development schedule is compressed with overlapping development stages and little or no time available between stages for resolving problems. According to an SSC laboratory official, when problems arise in one development stage they will be resolved in the next stage. However, such an approach increases the risks that the magnets will not work as intended.

In response to a recommendation by a sub-panel of DOE's High Energy Physics Advisory Panel, to provide more time to reduce this risk for magnets, the SSC laboratory added five months to the planned time for industry delivery of these first production magnets, from February of 1994 to July of 1994.

Despite the time extension, the magnet development schedule is still compressed. Each subsequent phase of development overlaps the preceding phase. For example, industry is scheduled to begin building its first full-size demonstration magnet at Fermi Lab in June of 1991, a full six months before the lab is scheduled to complete building and testing its first full-sized prototype.

The SSC laboratory will test the first group of industry-built demonstration magnets in an above-ground string test scheduled to be completed in the fourth quarter of fiscal year 1991. According to SSC Laboratory officials, this above-ground string test will determine whether the 50-millimeter dipole magnets will work together and with the other SSC components, including the electrical power supply and cooling systems.

Following completion of the string test the magnets are to be installed in the first sector of the underground tunnel for which construction is scheduled to begin, also, in the fourth quarter of 1991.

In summary, Mr. Chairman, although Germany has demonstrated the superconducting magnets can be industrially produced, their

magnets were made for a substantially smaller accelerator and involved different management approaches.

Whether the SSC's magnets will work as intended is uncertain because no full-size magnet of the current design has been built or tested. The schedule for developing the magnets is compressed and the overall risks for the magnets are high because little time will be available to resolve any problems that may be encountered.

In April 1991, we suggested that the Congress could limit the Government's financial risk by not funding tunnel construction until after the string test—critical to determining whether magnets will work as intended—shows that the magnets work as intended. Such contingent funding would ensure that a tunnel is not constructed before the SSC laboratory has demonstrated that industry can successfully produce these magnets.

Mr. Chairman, this concludes my remarks. I'd be happy to answer any questions you or the members of the subcommittee might have.

[The prepared statement of Ms. England-Joseph follows:]

United States General Accounting Office

GAO Testimony

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FEDERAL RESEARCH
Concerns About Developing and Producing Magnets for the Superconducting Super Collider

Statement of
Judy England-Joseph
Associate Director, Energy Issues
Resources, Community, and Economic
Development Division

Before the
Subcommittee on Investigations and
Oversight
Committee on Science, Space, and
Technology
House of Representatives

GAO/T-RCED-91-51

Mr. Chairman and Members of the Subcommittee:

We are pleased to be here today to discuss the status of the Department of Energy's (DOE) Superconducting Super Collider (SSC). My testimony today will focus on the approach DOE and the SSC Laboratory are using to develop and industrially produce the superconducting magnets for the SSC. My remarks are based on two recently issued GAO reports on the SSC. The first report, Federal Research: Super Collider Estimates and Germany's Industrially Produced Magnets, (GAO/RCED-91-94FS), was issued on February 12, 1991; the second report, Federal Research: Status of DOE's Superconducting Super Collider, (GAO/RCED-91-116), was issued on April 15, 1991.

My remarks about the magnets include the following points:

-- Although superconducting magnets for an accelerator have been industrially produced once, whether the DOE and the SSC Laboratory will be similarly successful is uncertain because they are taking a different approach to develop and produce the magnets for a substantially larger accelerator.

-- Full-size superconducting collider dipole magnets for the SSC's current design have not yet been built or tested, and a significant risk remains that the magnets may not work as intended.

-- The development schedule for these magnets is compressed and, as such, increases the risk that the magnets will not work as intended because little time has been allowed to resolve any problems that may be encountered.

Before I discuss these points in detail, let me provide some background information on the SSC and on Germany's accelerator, the Hadron Electron Ring Accelerator or HERA.

BACKGROUND

The SSC, which will be located about 30 miles south of Dallas, Texas, will be the world's largest high energy particle accelerator. A particle accelerator is a research tool used by physicists to seek fundamental knowledge about energy and matter. The SSC will collide two beams of protons at an energy of 40 trillion electron volts (TeV). A principal feature of the SSC is two rings of superconducting magnets located in an underground tunnel 54 miles in circumference. The two rings of magnets will steer and focus the proton beams in opposite directions until they collide at various interaction regions where large detectors will record the collisions for analysis by physicists. DOE recently estimated that the SSC will cost $8.2 billion (in current year dollars).

Our February 1991 report described Germany's experience producing superconducting magnets industrially for its high energy physics accelerator, HERA -- located at the Deutsches Elektronen-Synchrotron (DESY) laboratory in Hamburg, Germany. HERA, which will collide protons with electrons in a 3.9-mile ring, is substantially smaller than the SSC. HERA uses conventional magnets for its electron beam and superconducting magnets for its proton beam. HERA is one of only two accelerators built to date that use superconducting magnets. It is the only accelerator whose superconducting magnets have been industrially produced. Authorized in April 1984, HERA was completed after about 6-1/2 years of construction in November 1990. HERA was completed within 1 month of its original estimated scheduled date and within its original estimated cost of about 1.01 billion deutsche marks (about $673 million).

DOE'S APPROACH DIFFERS
FROM GERMANY'S

Germany's experience with building the HERA accelerator shows that superconducting magnets can be industrially produced. Numerous minor problems were encountered and resolved during the development and production of the magnets, but German officials told us that such problems should be expected when new technologies are involved. Germany's cost to produce the magnets industrially increased by less than 7 percent (from about $29.5 million to about

$31.5 million) over the 3-year life of the contract, and the magnets were delivered on schedule.

German officials attributed their success in having industry produce the superconducting magnets to four factors:

-- One person at DESY had the authority and the knowledge needed to make all decisions concerning the technology, budget, and schedule for the magnets.

-- The laboratory clearly identified the specifications for the industrially produced magnets before bids were requested.

-- The laboratory retained the flexibility to negotiate with the contractor by maintaining ownership of the tooling and the technology.

-- DESY fully measured and tested each magnet before accepting and installing it into the accelerator ring.

The SSC Laboratory has approached these factors differently in developing and producing superconducting magnets.

-- The SSC Laboratory relies primarily on other DOE laboratories' technical expertise with superconducting magnets.

-- The laboratory requested bids from industry to build magnets before building or testing a prototype magnet.

-- The laboratory retains ownership of the tooling and technology, but is allowing one contractor to take the lead in the design and development of tooling and techniques for producing magnets.

-- Finally, the SSC Laboratory plans to rely on the contractor to measure the magnets at the plant and to cold test about 19 percent of the magnets before they are installed in the collider's tunnel.

The most obvious difference between the HERA and SSC projects is that the HERA project was built at an existing accelerator facility while the SSC project is starting at a new location where no pre-existing accelerator exists. In designing and constructing HERA, DESY made extensive use of existing accelerators. For example, the injection energy level for protons was determined by the capability of the magnets in the existing accelerators at the site to accelerate protons. Therefore, Germany was able to focus most of its accelerator construction efforts on the additional requirements for HERA. In comparison, DOE and the SSC Laboratory have had to concern themselves with constructing the entire SSC

accelerator, as well as establishing and building the laboratory itself.

COLLIDER DIPOLE MAGNETS
ARE UNTESTED

The SSC Laboratory has not yet built or tested full-size 50-millimeter collider dipole magnets. Because of the December 1989 change in design from a 40-millimeter to a 50-millimeter aperture, the tooling for building these magnets only recently became available. Although testing continues on the 40-millimeter magnet, much of the needed data on the magnets' mechanics and performance will not be available until the 50-millimeter magnets are built and tested. To develop the superconducting magnets, the SSC Laboratory will build and test both model (1.8 meters in length) and full-size (15 meters in length) 50-millimeter magnets. Model magnets are used to test tooling and magnet design features for incorporation into the design and production tooling for full-size magnets. Under this approach, the design is to be subsequently detailed in a series of process and performance specifications for use by industry in producing full-size magnets.

Fermilab, which has a lead role in developing the magnets, has continued to build collider dipole magnets of the original 40-millimeter design. It has done so in order to test various components, such as insulation and the superconducting wire.

However, the 40-millimeter magnet program was reduced for fiscal year 1990. According to Fermilab officials, this was because the design was changed to the 50-millimeter magnet and because budget constraints limited the amount of superconducting wire bought for 1990. As a result, only four out of six proposed full-size 40-millimeter magnets were built in 1990. According to the Magnet Systems Division Director at the SSC Laboratory, because fewer 40-millimeter magnets were built, less test information was available. However, he considered that the impact on the program will be minimal because development planned for the 40-millimeter magnets will take place using the 50-millimeter magnets.

Fermilab received the tooling for the model 50-millimeter magnets in October 1990. It completed and began testing the first of these model magnets in December 1990. Due to the lead time for purchasing the tooling following the design change to a 50-millimeter aperture, it did not receive the tooling for the full-size 50-millimeter magnets until April 1991. Therefore, Fermilab has only recently begun to build the first full-size 50-millimeter magnet.

COLLIDER DIPOLE MAGNET DEVELOPMENT SCHEDULE IS COMPRESSED

The magnet development schedule is compressed, with overlapping development stages and little or no time available

between stages for resolving problems. According to an SSC Laboratory official, when problems arise in one development stage they will be resolved in the next stage. However, such an approach increases the risks that the magnets will not work as intended.

A Subpanel of DOE's High Energy Physics Advisory Panel (HEPAP) noted that the magnets are costly (about $2 billion), require additional development to achieve a proven design for a 50-millimeter aperture, need tooling and assembly methods for mass production, and must be thoroughly tested before the SSC Laboratory commits to production. The subpanel concluded that the schedule was "not realistic" and recommended adding 6 to 12 months to the early part of the schedule. Among other things, this rescheduling would provide more time to reduce risk for the magnets. In response to the HEPAP recommendation, the SSC Laboratory added 5 months to the time planned for industry delivery of the first production magnets -- from February 1994 to July 1994.

Despite the time extension, the magnet development schedule is still compressed. For example, in July 1990 the SSC Laboratory issued a Request for Proposals for collider dipole magnets. In October 1990 the SSC Laboratory announced that General Dynamics and Westinghouse were selected to enter into negotiations for the contract. Thus, the SSC Laboratory solicited offers even before Fermilab began building the first model 50-millimeter magnet in October 1990.

In addition, each subsequent phase of development overlaps the preceding phase. For example, before Fermilab completes building and testing its first full-size 50-millimeter dipole magnet in November 1991, industry is scheduled to begin building its first full-size demonstration magnet at Fermilab in June 1991.

The SSC Laboratory will test the first group of industry-built demonstration magnets in an above-ground string test scheduled to be completed in the fourth quarter of fiscal year 1992. According to SSC Laboratory officials, this above-ground string test will determine whether the 50-millimeter dipole magnets will work together and with the other SSC components, including the electrical power supply and cooling systems. If the magnets do not work, the success of the SSC project will be jeopardized. For example, after the project was authorized in 1978, DOE had constructed about one-third of the tunnel for a collider called ISABELLE in 1980, when it encountered unexpected problems with its superconducting magnets. DOE made a considerable effort to address the magnet problems, but in 1983 DOE terminated the project. When terminated, over $200 million had been spent and 75 percent of the project's conventional construction had been completed.

Following successful completion of the string test for the SSC's magnets, the magnets are to be installed in the first sector

of the underground tunnel to further demonstrate the installation and performance of the magnets when integrated with the cooling systems. Construction of the first tunnel sector, about 8 miles in length, is scheduled to begin in the fourth quarter of fiscal year 1992.

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In summary, Mr. Chairman, of the uncertainties and risks associated with the construction of the SSC, the major technical risk concerns the collider dipole magnets. Although Germany has demonstrated that superconducting magnets can be industrially produced, their magnets were made for a substantially smaller accelerator and involved different management approaches. Whether the SSC's magnets will work as intended is uncertain because no full-size magnet of the current design has been built and tested.

Although DOE has taken some action to reduce the risk, such as delaying the start of magnet production, uncertainties and risks remain. The schedule for developing the magnets is still compressed and the overall risks for the magnets are high because little time will be available to resolve any problems that may be encountered.

A critical test in determining whether the magnets will work as intended is the above-ground string test scheduled for the

fourth quarter of fiscal year 1992. Tunnel construction is also scheduled to start in the fourth quarter of fiscal year 1992. In our April 1991 report, we suggested that the Congress could limit the government's financial risk by not funding that tunnel construction until after the string test shows that the magnets work as intended. Such contingent funding would ensure that a tunnel is not constructed before the SSC Laboratory has demonstrated that industry can successfully produce the magnets.

Mr. Chairman, this concludes my prepared remarks. We will be happy to respond to any questions you may have.

Mr. WOLPE. Thank you very much. Is that or was that a vote?

MALE VOICE. I think, sir, it was the Democratic caucus.

Mr. WOLPE. Oh, okay, okay.

Mr. BARTON. You might want to go, Mr. Chairman. [Laughter.]

Mr. WOLPE. Thanks, Mr. Barton.

Returning to the questions of the GAO, we've been joined by another colleague from the full committee, Mr. Hall, and I'd just like to let Mr. Hall make any remarks he might care to make at this point.

Mr. HALL. Thank you, Mr. Chairman. May I submit an opening statement for the record?

Mr. WOLPE. Surely. Without objection, it will be included in the record.

[The prepared opening statement of Mr. Hall follows:]

THE HONORABLE RALPH HALL

OPENING STATEMENT FOR OVERSIGHT AND INVESTIGATION HEARING ON THE SUPERCONDUCTING SUPER COLLIDER
MAY 9, 1991

MR. CHAIRMAN, I AM HERE TODAY TO LEND MY SUPPORT FOR A PROJECT WHICH WILL OFFER SCIENTIFIC OPPORTUNITIES THAT HAVE NEVER BEFORE BEEN AVAILABLE. THE SUPERCONDUCTING SUPER COLLIDER WILL ALLOW SCIENTIST TO CONDUCT EXPERIMENTS AND MAKE DISCOVERIES THAT WILL GREATLY FURTHER THIS COUNTRY'S TECHNOLOGICAL ABILITIES TO FINDING SOLUTIONS THAT INVOLVE HIGH-ENERGY PHYSICS.

I AM CONFIDENT THAT THE TESTIMONY GIVEN DURING THIS HEARING BY GARY GIBBS OF THE DEPARTMENT OF ENERGY AND OTHER EXPERT WITNESSES, THAT THE FEASIBILITY, PRACTICALITY AND APPROPRIATENESS OF THE SUPERCONDUCTING SUPER COLLIDER WILL BE AMPLY DEMONSTRATED. I HAVE CLOSELY MONITORED THE DEVELOPMENT OF THIS PROJECT, AND I AM AWARE OF THE VARIOUS CHANGES THAT HAVE BEEN MADE IN THE DESIGNS AND THE COST ESTIMATES. IT IS MY HOPES THAT DURING TODAYS HEARING THAT THE REASONS FOR THESE CHANGES WILL BE CLARIFIED AND THEIR JUSTIFICATION WILL BE APPARENT. I HAVE RECENTLY LEARNED, FOR EXAMPLE, THAT A CONTRACT WILL BE AWARDED FOR THE FINAL DESIGN AND INITIAL PRODUCTION OF THE QUADRUPOLE MAGNETS FOR THE PARTICLE ACCELERATOR. IT IS IMPORTANT TO NOTE THAT THE CONTRACT WILL BE AWARDED AHEAD OF SCHEDULE AND SIGNIFICANTLY UNDER BUDGET.

I AM ALSO AWARE OF EFFORTS TO DISCREDIT THE MANAGEMENT OF THIS PROJECT. I HAVE MET OFTEN WITH THE SSC DIRECTOR, DR. ROY SCHWITTERS AND WITH MR. HENSEN MOORE OF THE DEPARTMENT OF ENERGY, AND I HAVE EVERY CONFIDENCE IN THEIR TEAM TO PROVIDE THIS COUNTRY WITH A FIRST RATE LABORATORY FOR HIGH-ENERGY PHYSICS THAT WILL SUCCESSFULLY FULFILL THE GOALS THEY HAVE PREVIOUSLY OUTLINED TO THIS COMMITTEE.

I WOULD ALSO LIKE TO POINT OUT, THAT THIS COMMITTEE, AS A WHOLE, HAS HISTORICALLY GIVEN ITS FULL SUPPORT TO THE SSC. UNDER THE LEADERSHIP OF ROBERT ROE, WE ENDORSED THE GOALS OF THIS PROJECT AND THE METHODS BY WHICH THEY WERE TO BE ATTAINED. THE SSC IS STILL RIGHT ON TRACK AND I LOOK FORWARD TO THE CONTINUED SUPPORT BY THIS COMMITTEE UNDER THE NEW, AND VERY ABLE, LEADERSHIP OF MR. BROWN.

Mr. WOLPE. Before turning to the substance of your testimony Ms. England-Joseph, I'd like to ask consent to introduce into the record a communication that was delivered to the subcommittee at 6:45 last night. It's a letter from Admiral Watkins in which he takes a very strong exception to a recently released GAO report on issues related to the SSC. If there's no objection, it will be introduced into the record.

[The letter of Secretary Watkins dated May 8, 1991, follows:]

The Secretary of Energy
Washington, DC 20585

May 8, 1991

The Honorable Howard Wolpe
Chairman, Subcommittee on
Investigations and Oversight
Committee on Science, Space,
and Technology
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

I want to take this opportunity to comment on the report issued April 15, 1991, by the General Accounting Office (GAO) on the Superconducting Super Collider (SSC) project. This report is an example of how the GAO does not always serve the best interests of the Congress or the taxpaying public. The GAO reports should provide the Congress with a complete and unbiased picture of the issues and a full set of facts that are pertinent to the concerns of the Congress and the decisions it faces. This report misses that fundamental purpose by a wide mark. It was released by the GAO with no opportunity for the Department to comment on the information presented or the veracity of the conclusions.

Addressing the key points of the GAO report, I want to first comment about the management. The SSC has received my priority attention since arriving at the Department over 2 years ago. Deputy Secretary Henson Moore is involved with the program on almost a daily basis. We have a strong management team in place, a team that has successfully built large projects and one that possesses world-renowned technical capabilities. I personally look to Mr. Joseph Cipriano and Mr. Edward Siskin to manage this project on a daily basis and to report to me on the health and well being of the SSC. At Headquarters, Mr. Garry Gibbs, Deputy Director of the SSC office, has been the Acting Director since last July and continues to provide the strong leadership and guidance needed for activities for this program.

Second, regarding the footprint and site geology, the Texas site in Ellis County has proven to be an excellent choice, the best of seven candidate sites from around the country. The configuration of the ring and its exact location (the footprint) underwent extensive evaluation before the State of Texas was requested to begin acquiring land. A sound and comprehensive geotechnical program is in place and construction in the Eagle Ford shale is being held to a minimum. Construction in this rock formation is well within the state-of-the-art for tunneling and its cost is included in the baseline cost estimate.

Third, the superconducting magnet program is moving forward in a measured and thoughtful manner. This program is carefully structured to effect the transfer of the magnet technology from the laboratory to industry, who will in turn develop the design and tooling to manufacture and produce large quantities of these magnets. The challenge of the magnets is not in the design of the magnets but in their manufacture with a uniformity of performance and control of unit cost. Results of tests done with 1.8-meter models of the new 50-mm diameter design have been quite successful and give us confidence that we are on the right track. Production tunneling will not begin until we are sure that we have achieved the desired performance of the magnets and we have demonstrated their reliable manufacture.

Lastly, the State of Texas has been very supportive of the SSC project and they have provided leadership and resources in meeting their commitment of the land and $1 billion for the SSC. The Memorandum of Understanding signed between the Texas National Research Laboratory Commission and the Department reflects the spirit and the reality of this commitment. As our first major partner, Texas is providing $149 million for the project in FY 1991 and another $130 million is expected for FY 1992.

I've provided additional information and details on these items in the enclosure for your reference and use.

We are at a critical stage in moving ahead with successfully building the SSC. We have provided a responsible and credible baseline and are committed to building the SSC on schedule and within budget. This is the critical year to ramp up the funding for construction; we need your help. Other prospective partners are closely watching the actions of Congress to determine the national will and commitment to this project.

Sincerely,

James D. Watkins,
Admiral (U.S. Navy, Retired)

Enclosure
SSC Status and Progress

SUPERCONDUCTING SUPER COLLIDER

STATUS AND PROGRESS

SSC Management

Dr. Roy Schwitters was named the Superconducting Super Collider (SSC) Laboratory Director the same day that the Department announced the selection of Universities Research Association (URA) as the Management and Operating contractor to build the SSC. As the Laboratory Director, Dr. Schwitters has provided the critical leadership and overall direction for the project during the early, formative stages of establishing and staffing the Laboratory organization. Although some of the key management positions at the Laboratory were initially filled on an acting basis, the key people responsible for the accelerator design and magnet development have been there from the outset.

In April 1990, the Department recruited Mr. Joseph Cipriano to become the Department of Energy (DOE) Project Director at the SSC On-Site Project Office to be responsible for the day-to-day DOE oversight and management of the URA contract and SSC Laboratory activities. To further strengthen the management of a large project the scale of the SSC, the Laboratory brought in Mr. Edward Siskin to become the General Manager for the SSC Laboratory in October 1990. At this same time, Mr. Paul Reardon was named the Project Manager at the SSC Laboratory.

This team brings together a strong combination of both technical and large project management experience. It has been in place for some time now and is making its impact felt. At this time, we can attest to the fact that the SSC project is on schedule and below the baseline budget outlined in the "Report on Superconducting Super Collider Cost and Schedule Baseline."

The General Accounting Office's (GAO) attempt to compare the management of this project with experience at the Social Security Administration seems to stretch the bounds of believability for an undertaking of the scope and complexity of the SSC. This project has received the highest level of attention and priority by both the Deputy Secretary and myself since we arrived at the Department. In the Office of Energy Research, there have been only two "Acting" Directors of the SSC office, one for 15 months and the present Deputy Director, Mr. Garry Gibbs. Mr. Gibbs has been the Deputy since August 1989, and has been the Acting Director since July 1990. He continues to provide the needed strong leadership and guidance for the headquarters' program activities.

Footprint and Site Geology

This description of the SSC site geology is misleading and does not capture the extent of the considerations that led to defining the final footprint. Neither does it properly describe the present SSC Laboratory plan to characterize the site. The Ellis County, Texas, site was the best choice from seven of the best geological locations in the United States. The "SSC

Footprint Characterization Document" (SSC-SR-1041) describes in detail the considerations which resulted in setting the configuration and final footprint. An extensive investigation of underground conditions was conducted by the SSC Laboratory in addition to that conducted by the Texas National Research Laboratory Commission (TNRLC).

The final ring configuration represents the optimal location and was based on considerations of: machine constraints, tunnel length in each material type, service area shaft depths, experimental hall depth, experimental hall foundation requirements, and cost. Construction in the Eagle Ford shale has been held to a minimum, its effect is included in the baseline cost estimate, and techniques for underground tunneling are well within the state-of-the-art.

The decision to sink an exploratory shaft was put "on hold" while decisions on a prototype tunnel, as an alternative, were made. During the development of the baseline cost and schedule estimate, an exploratory shaft was added back into the geotechnical program. This exploratory shaft and associated instrumentation are now in the program, they are in the baseline budget and schedule, and a contract will be let this summer for their construction.

Magnets

The GAO report repeatedly refers to the magnet development as being "compressed", quoting as an example the issuance of the request for proposals (RFP) for the collider dipole magnets in July 1990, "...even before Fermi National Accelerator Laboratory began building the first model 50-mm magnet in October 1990." This portrayal of the magnet development program and this RFP is misleading and needs clarification.

It is important to note that these are cost-plus contracts for engineering development work to finalize the magnet design, they are not fixed-price contracts for production. Thus, the exact details of the design of these magnets were not specified because, in fact, the objective of these contracts is to complete their engineering development and the final design before they begin production. The fixed-price contract(s) for production will not be let until late 1994, after the design has been fixed and tests confirming their performance completed. A solid technology base is available to proceed with the final stage of the magnet development program. Tests of the 40-mm dipole magnets over the last several years have been successful, with more than a dozen each of short and long magnets. In fact, contrary to the tone of the report, the change from 40 mm to 50 mm in aperture diameter represents a relatively small modification of the design; with the 50-mm magnets being easier to design and to fabricate.

The GAO report expresses concern that "...each subsequent phase of development overlaps the preceding phase." This schedule is consciously structured to accomplish this very effect. Concurrent engineering, with overlap between product development and manufacturing, is now widely practiced in industry because it saves money and is effective in reducing time to produce. It is this very practice which allows Japanese auto makers to produce a new car model in record time.

The problem with magnets related to the ISABELLE project occurred well over a decade ago, before there was any experience with accelerators using superconducting magnets. By now, there is 8 years of experience with the 6-kilometer circumference Tevatron collider and industry has demonstrated the capability to successfully produce superconducting magnets for Hadron-Elektron-Ring-Anlage (HERA), also 6 kilometers in circumference. The Soviet Union is building a 3-TeV superconducting accelerator, the UNK.

Design work on the SSC magnets began almost 7 years ago. The coil type was chosen 5 years ago. There were difficulties with the first seven full-length SSC dipoles magnets, but these problems were overcome 3 years ago when the "fully constrained" design was introduced. Fifteen long dipoles have been built and tested since that time, with good results--all of the magnets performed to the limit of their superconducting material. The design and production of the 50-mm dipole magnets is not terribly different from that experience gained in producing the 40-mm magnets and the 75-mm magnets for HERA. This assessment is further supported by the excellent performance achieved with the very first 50-mm, short (1.8-meter) models.

The successful completion of the magnet string test is not a prerequisite for start of tunnel construction. While earlier results are expected, the milestone for successful completion of the string test is the fourth quarter of FY 1992. Tunnel construction is on the critical path for completion of the project and the present schedule calls for beginning to construct a short tunnel sector only shortly before the magnet string test is completed. It takes more than 2 years to construct a tunnel section and to outfit it for magnet installation. Beginning tunnel construction late in FY 1992 is critical to meeting the scheduled ramp-up in high-rate dipole magnet production scheduled for late in 1994.

Texas Memorandum of Understanding

The State of Texas has been fully supportive of the SSC project and, in the Department's opinion, the Memorandum of Understanding (MOU) between DOE and Texas meets the full spirit of the Texas proposal. The Texas proposal was voluntary, opened by the Department only after the Texas site in Ellis County was selected. This selection was on technical merits only, with the Texas site being the best choice out of seven candidates.

The MOU reflects the full scope and intent of the agreement and understanding with Texas on their support for the SSC. In addition to the $1 billion that Texas has committed, they are also providing the land for the SSC at no cost to the Federal government. Of the $1 billion, the Texas proposal included $125 million for SSC related research and development, fellowships and educational activities not related directly to building the SSC. The balance of the $1 billion, $875 million, is directly supporting the construction of the SSC and, by formal definition of project costs, will offset the total project cost.

Mr. WOLPE. Mr. Watkins obviously feels very strongly about the substance of the GAO report. One line from the letter reads, "This report is an example of how the GAO does not always serve the best interests of the Congress or the taxpaying public."

He goes on to say in his letter that the report was released by the GAO with no opportunity for the Department to comment on the information presented or the veracity of the conclusions.

I'd like to know whether that is an accurate statement or whether the GAO in fact submitted its findings to the Department of Energy before final approval.

Ms. ENGLAND-JOSEPH. I would be happy to respond to that. As you know, sir, we take great pride in assuring that our work is independent and credible. And at the end of every review that we conduct, we have an exit conference. It's a conference that brings together both the GAO audit team and the key members of the organization in which we're auditing or reviewing.

In the cases of both reports that we've issued on the superconducting super collider this year, we had exit conferences, both with the people in Dallas, and here at headquarters. In addition to that, sir, we provided the Department of Energy with a statement of facts in both cases, to assure ourselves that the facts are in fact correct. In both of those cases, what we do provide to the DOE is not only a statement of fact, but a request for them to identify whom we should meet with to assure ourselves that in fact, the Department is in fact, appropriately and adequately giving attention to the issues that we're presenting.

In both cases we did not elect who should be at those meetings. It was in fact the Department of Energy's management that determined who attended those meetings.

And we have documentation to support the conclusions that were drawn at those meetings in terms of summaries documenting the concerns and comments that they had about our facts. Where we felt it was appropriate, we incorporated those suggestions in the body of our report.

As it relates to conclusions, there are times when the Congress and the particular Members of the Congress, in requesting GAO's work, ask us not to—request not getting formal agency comments; that means written comments that are actually produced in the back of the body of the report. In both of these cases, the requesters asked not for formal comment. That's why we assured ourselves that at least the statement of facts were correct.

In both of those cases, however, we did not present them with conclusions because we feel that, that is critical to the requester's own use.

Mr. WOLPE. So, so the DOE did receive a copy of your report and you did meet with the designated officials?

Ms. ENGLAND-JOSEPH. Yes, sir. Statement of facts.

Mr. WOLPE. Statement of facts.

Ms. ENGLAND-JOSEPH. I won't argue that they didn't see the actual report because——

Mr. WOLPE. That's right, the draft, the draft of which was the statement of the facts.

Ms. ENGLAND-JOSEPH. Exactly.

Mr. WOLPE. DOE did have an opportunity to comment on those facts?

Ms. ENGLAND-JOSEPH. Yes, several times.

Mr. WOLPE. And you in fact incorporated certain of their comments into your revision of that report——

Ms. ENGLAND-JOSEPH. That's right.

Mr. WOLPE [continuing]. That is now before us. Thank you.

Ms. ENGLAND-JOSEPH. If I might also respond just in general to Secretary Watkins' criticism about GAO. It might be useful to note that only two weeks ago I testified before the House Armed Services Committee regarding the Naval Reactor's Program because GAO had been asked by Congressman Synar to look at environmental, health and safety issues associated with that program.

That was one of those times where GAO came up and provided a positive message regarding the quality of the, program. There are numerous allegations about environmental health and safety problems at the Naval Reactors Facilities. And we did a comprehensive evaluation and found no problems. And in fact, we reported that it was a positive program. In that case, the Secretary was more than happy to note that GAO is a hard hitting independent credible organization. [Laughter.]

Ms. ENGLAND-JOSEPH [continuing]. That assures itself of the facts and because of that we, he accepted our glowing endorsement. It may very well be the difference is that we're maybe being a little bit more critical here, as it relates to the SSC.

Mr. WOLPE. I think that might have something to do with it. [Laughter.]

Just because any Cabinet official or any Executive official disagrees with the GAO conclusions, it seems to me rather harsh to say the least, to suggest that GAO is working against interests of Congress and the interests of taxpayers.

I'd like to turn now to the substance of your testimony and as it relates to particularly the German experience. To begin with, why did Germany find it important for its decision maker to have the technical knowledge and expertise for the superconducting magnets?

Ms. ENGLAND-JOSEPH. The Germans found that many decisions involving the magnets really required a number of tradeoffs, tradeoffs not just in the technical aspects of those magnets and their design but in fact, in the budget, in schedule associated with producing those. And as you know, when you have in one person, knowledge of both technical as well as management, cost budget issues, you're much able, better able to make appropriate trade-offs and in this case having one person allowed them to make those trade-offs so they wouldn't go too far to the technical side, pretty much at—regardless of cost—and would not go too much on the cost and schedule side and maybe limit the technical capability of those magnets.

Mr. WOLPE. Does the SSC laboratory have a decision maker with the technical knowledge and expertise at the laboratory?

Ms. ENGLAND-JOSEPH. As our report pointed out in February of 1991, much of the expertise for the superconducting magnets really resides in the DOE laboratories; those are at the Fermi Lab in Illinois, the Brookhaven Lab in New York, but also, Lawrence Berke-

ley Livermore—in the Lawrence Berkeley laboratory in California—have been working very closely with the magnet people at Fermi Lab. So they've depended quite considerably on the laboratories themselves rather than having in-house capability within the SSC project.

In November of 1990, they did hire at the SSC laboratory, a senior person with expertise in superconducting magnets. This person has worked with the superconducting magnets at Lawrence Berkeley Laboratory and he fills a senior key position at the SSC lab magnet division.

Mr. WOLPE. Will that person be the key decision maker for the magnets?

Ms. ENGLAND-JOSEPH. No, sir. This person is a senior staff member, he doesn't make all the decisions. He basically provides information to the decision maker. The decision maker in this case is the Associate Director for the laboratory's magnet division who has total responsibility for the magnets, but again does not have that magnet experience.

Mr. BARTON. Mr. Chairman, could we have that individual's name for the record?

Ms. ENGLAND-JOSEPH. Thomas Bush.

Mr. BARTON. Thank you.

Mr. WOLPE. Why did the Germans find it important to identify the specifications for the magnets before going out for bids?

Ms. ENGLAND-JOSEPH. Basically, I would say to hold the companies responsible for the magnets. I think they wanted to demonstrate a proven design in making sure that the prototype was designed in a way that can be met and then be able to have specifications that are clear enough for companies to follow. So, it was basically to hold accountants—those companies accountable to the actual production of those magnets.

Mr. WOLPE. And will the SSC laboratory be able to similarly hold the companies accountable for producing magnets that work?

Ms. ENGLAND-JOSEPH. Well, there's greater emphasis in the SSC time-frame as it relates to the production of those magnets and pretty much the speed of production, I think will probably drive the production of those magnets, perhaps over whether those magnets can work and work well. So, it may be a very big problem because the schedule is compressed and overlapped. And as you know, as it relates to the way they've designed this program, they will be producing while they are still testing and developing.

Mr. WOLPE. Okay. In order to allow maximum participation, I want to try to keep as closely to our five minute rule principle as possible so we can move around the members of the subcommittee. So at this point, let me yield to my distinguished colleague, Mr. Boehlert.

Mr. BOEHLERT. In your testimony you cited an example of overlapping phases. Am I correct in reading the example you state, that industry is scheduled to begin building its first full-sized magnet in June 1991, even though Fermi Lab will not complete building and testing its first full-sized magnet until November of 1991?

Ms. ENGLAND-JOSEPH. Yes, sir.

Mr. BOEHLERT. Why is GAO concerned with the overlap between the development and production phases? Wouldn't a compressed schedule complete the project faster?

Ms. ENGLAND-JOSEPH. It could if there are no problems. This is a—as you well know—a technologically complex project. We've never done this before, a lot of risks associated with the production of these magnets that have been borne out by various expert panels.

Concurrency is a concern that we have expressed in other work that GAO has done, primarily in the Department of Defense. And in our development of weapons systems, where as you probably are well aware, there are a number of weapons systems where concurrency has been allowed to occur where development and design were going on at the same time that production was going on, to find out at the end, that the systems do not work.

And that's our concern, that the compressed schedules, overlapping phases, are okay when you are manufacturing something that you have done before and you know the system very well, you know what you are coming up with in the end and you know it's going to work in the end. But, if you don't know it's going to work, then you need to be sure that the overlapping schedules aren't so overlapping that you don't have time to fix problems.

Mr. BOEHLERT. So this is clearly high risk, and you would classify it as such?

Ms. ENGLAND-JOSEPH. Yes, sir.

Mr. BOEHLERT. Why do you think the Germans thought it was important to maintain ownership over the magnet tooling and technology?

Ms. ENGLAND-JOSEPH. I think basically to be able to have leverage over the contractors, to be able to walk away from a contractor if the contractor wasn't producing those magnets in a way that met their specifications.

Mr. BOEHLERT. Well, wouldn't the United States do this?

Ms. ENGLAND-JOSEPH. There's a much different relationship, I think, that, that the Department of Energy has had in the past with its contractors. It's one of a partnership. I think in this case, the way the contracts are intended to be designed, in part, would allow the contractors to have all the technical knowledge in development. If they walk away, part of the technology actually walks away. So, the ability to maintain a lot of that technology in-house with the Government is not there.

Mr. BOEHLERT. Well, tell me about the so-called concept of leader-follower.

Ms. ENGLAND-JOSEPH. The leader-follower concept is basically to identify two contractors that will actually develop and produce the magnets, the follow—the leader actually does the design. The follower inherits or learns from those designs and actually follows the leader in developing and designing those magnets.

The intent behind the leader and follower concept is to have some competition in the development and production of these magnets.

One problem associated with the leader-follower concept is that the leader may not share all the information and technical expertise that they gain as they develop those magnets so they do end

up having a competitive edge over the follower. There is some question as to whether the competition, I think is being sought in this leader-follower approach, may not actually come about.

Mr. BOEHLERT. Well then, the follower won't be as proficient and this would decrease the SSC's leverage over the leader. Isn't that true?

Ms. ENGLAND-JOSEPH. Yes, sir. That could happen.

Mr. BOEHLERT. What about the SSC laboratory itself? By relying on the leader, doesn't it essentially become a follower too?

Ms. ENGLAND-JOSEPH. If they don't have the technical expertise in-house in order to adequately oversee the technology and development, then in fact they are depending very definitely on the contractor that has that leader technology and information.

Mr. BOEHLERT. Why did the Germans test all the magnets before installing them into the accelerator ring?

Ms. ENGLAND-JOSEPH. They wanted to make sure they worked before they put them underground. The Germans told us that it's much more costly to put a magnet underground and find out that it doesn't work and have to take it back out. And so they wanted to be sure that all of those magnets worked before they actually put them underground.

And, just as an afterthought regarding that, the answer to my question, there's a—in the German experience, they identified a number of problems at the very end of their production cycle. They found some problems with magnets at the end. So it wasn't as if the production system was so perfect that once they figured out that they could build one and it was meeting specifications and there were no problems, that there weren't actual problems in production near the end for whatever quality control or other reasons. And I think that adds additional weight to the need for testing the magnets when we're talking about the SSC magnets, we're talking about 8,600 as it relates to the dipole magnets, and just because the first ones may look and work well doesn't necessarily mean the last ones will either.

Mr. BOEHLERT. 8,600 highly specialized, highly sensitive magnets that have never before been developed, a lot of questions are posed by that. Wouldn't it be cost effective for the SSC laboratory to also fully test each of the magnets before installing them in the tunnel?

Ms. ENGLAND-JOSEPH. I don't think I can give you a definite yes answer because there is a major difference between the German and the U.S. approach. And the Germans only had 422 magnets they were putting underground and we're talking about 8,600, so there's the magnitude issue here.

Mr. BOEHLERT. Well, what were the numbers again?

Ms. ENGLAND-JOSEPH. They were 422 magnets for the HERA and 8,600 of the dipole magnets for the superconducting super collider. So there could be some cost effectiveness issues associated with testing a certain number of them and then putting them underground. If you assure yourselves that the string test works and that those magnets can work as designed and then you begin to put them underground, then I think as long as you're testing those that are above ground as you're continuing to implement the remaining magnets, I don't see a problem with that. I don't think

you need to have tested all 8,600 before you actually go underground.

Mr. BOEHLERT. This is one that puzzles me. Why do you think the cost estimates made by DOE's independent reviews are higher than DOE's latest costs estimates for the SSC? That's rather curious, isn't it?

Ms. ENGLAND-JOSEPH. The biggest difference, I would say is that the other cost estimates see a higher risk associated with various aspects of the project. The biggest risk they see being the magnets themselves and the DOE estimate is assuming that the risks aren't quite as great.

Mr. BOEHLERT. Well, do you usually find that in your studies that the advocates usually minimize the risk where the more objective people will be more realistic in assigning the risk?

Ms. ENGLAND-JOSEPH. I think there are probably motivations to be optimistic. I think the entire schedule that we're talking about with this super collider is very optimistic. And I think they're probably being equally optimistic in cost estimates although we've not done the work in getting beyond all the cost estimate analysis that they've done, to really give you a real analytical answer.

Mr. BOEHLERT. Well, do you have an opinion on the accuracy of the cost estimates?

Ms. ENGLAND-JOSEPH. Because we haven't done the audit work associated with really looking at all of their analysis, I'd say I won't——

Mr. BOEHLERT. On, on the surface, aren't you somewhat scared by the——

Ms. ENGLAND-JOSEPH. Big range,

Mr. BOEHLERT [continuing]. Big range, within DOE, I mean we're not talking about outside, we're talking internal.

Ms. ENGLAND-JOSEPH. Yes, sir. There is a significant range and I think it's an area that's worth pursuing. But, the biggest area that we've been able to identify from the documentation that we've looked at so far is this issue of uncertainty and risk, that the amount of risk associated with the costs of this program are much greater as viewed by the ICE group, by HEPAP, than by, or ERC, than by the DOE people.

Mr. BOEHLERT. Well, to meet the—yes, the, the time bell did not go off, so we're going to have to use the gavel after all.

Mr. WOLPE. Finish your question up please.

Mr. BOEHLERT. Well, I was just—the latest cost estimate is $8.249 billion, I believe. It seems that's the cost estimate that provides the most rosy scenario—to use a phrase that is common in this town—and really minimizes any risk and really turns aside the possibility of any uncertainty. Is that a fair assumption on my part as I analyze that without going into depth in your analysis.

Ms. ENGLAND-JOSEPH. I think the part that's more obviously rosy is the schedule, the compressed schedule and the fact that there is a number of overlapping phases. I think that, in and of itself, tells us that they're hoping or betting on the fact that these things will work the first time out and that it won't cost as much to rework them if we have to rework them. I think they're assuming that there will be little or no rework at all.

Mr. BOEHLERT. The likelihood of that is minimal.

Ms. ENGLAND-JOSEPH. When we're talking about a technologically complex program such as this, there is certainly a lot of risk and if we rush into it, there's probably a lot of rework.

Mr. BOEHLERT. Thank you very much.

Mr. WOLPE. Thank you very much.

Mr. Geren?

Mr. GEREN. Thank you, Mr. Wolpe. The requestor of the report was Senator Sasser?

Ms. ENGLAND-JOSEPH. Yes, sir.

Mr. GEREN. You said that the requestor made some, asked for some limitation on the ability of the DOE to comment on the conclusions, would you elaborate on that?

Ms. ENGLAND-JOSEPH. It's really up to the decision or option of each requestor in requesting GAO to determine whether official agency comments in writing—actually prepared and put in formal documentation—printed in the report, whether—they choose whether they'd like to have those formal agency comments or not and in this case they elected not to have formal agency comments.

Mr. GEREN. You say, "they," Mr. Sasser, Senator Sasser?

Ms. ENGLAND-JOSEPH. The subcommittee and yes, sir, the requestor and his staff.

Mr. GEREN. So, he, could you say—describe specifically what he requested? I mean, what kind of limitations he asked?

Ms. ENGLAND-JOSEPH. The only limitation was not to go for an official agency comment for the report.

Mr. GEREN. Is that uncommon?

Ms. ENGLAND-JOSEPH. No, sir.

Mr. GEREN. How often does that happen?

Ms. ENGLAND-JOSEPH. I can't give you a percentage of time but in the energy area, the area that I have responsibility for, most of the time the requestor does not ask for full agency comments. And that's why we take such deliberate action in providing a statement of facts to the agency and why we have numerous meetings and exit conferences, to assure ourselves that in fact all the information that we're providing to the committee is factually correct.

Mr. GEREN. And, do you find that having agency comments is useful?

Ms. ENGLAND-JOSEPH. If the agency takes the time and attention in an exit conference or in reviewing a statement of facts, I think that we get the sum and substance of the quality of their review, as we would in a formal agency comment. The difference is that a formal agency comment would provide an official record that's documented and printed in a report from the agency head or appropriate official, responding to each point within the GAO report.

The other difference is that in an official comment, they see the entire report which includes conclusions and recommendations. And as I mentioned earlier, when we go for fact sheet review, a statement of facts review, we do not provide them with conclusions and recommendations. Although I might add that at times it's pretty obvious where we're concluding when they see—they basically see the body of the report; they see the headings, they see much of what we're leading up to, they just don't see the actual conclusions and recommendations.

Mr. GEREN. Why would—I'm not asking you to read the mind of Senator Sasser—but why would a requestor not allow the agency—what advantage is there in that? It would seem to me that, that would inhibit frank discussion of the conclusions and recommendations.

Ms. ENGLAND-JOSEPH. I think at times—and I, again I can't answer for, as you know, for Senator Sasser—but at times I think the requestors and the members are interested in getting those reactions and responses directly themselves in open hearings, such as this, so that the requestor can actually question and ask for a response from the agency for the report that GAO has done. So, I think—and many times, when a requestor to get official comments, it doesn't mean they aren't going ultimately going to get some sort of comment from the agency; they in fact seek that at times in open hearings such as this.

Mr. GEREN. Thank you. Mr. Chairman, I have no other questions.

Mr. WOLPE. Thank you, Mr. Geren.

Mr. Sensenbrenner?

Mr. SENSENBRENNER. Well, thank you, Mr. Chairman. I think we've got the response from the agency in the letter that Secretary Watkins sent, indeed it may aid Chairman Wolpe and Ranking Minority Member Boehlert. I think that this is rather a great tale and now that it's part of the record, I think the record is replete that the agency has responded, although it is not in the actual four corners of the GAO report.

The concern that I have, recognizing that I think the magnets are probably the achilles heel of this entire operation, if the magnets don't go well, the project isn't going to go well and it will cost a lot more money to complete the project. There was a staff meeting yesterday at which GAO said the magnets are installed and tested at the contractor's risk, prior to acceptance under the contract. My question for you is, what review of these contracts have you undertaken that leads you to contradict GAO's representation by staff yesterday afternoon?

Ms. ENGLAND-JOSEPH. Are you saying by the DOE staff, not the GAO staff?

Mr. SENSENBRENNER. DOE, I'm sorry.

Ms. ENGLAND-JOSEPH. We have not looked at the contracts themselves at this point.

Mr. SENSENBRENNER. Well, if there's something wrong with the magnets and it's at the contractors risk prior to DOE's acceptance, how does that run up the cost of the project.

Ms. ENGLAND-JOSEPH. That shouldn't run up the cost of the project if in fact the liability and the assurance that the magnets are produced as intended and meet the specifications are all a part of the costs of the contract as the contractor has accepted that.

Mr. SENSENBRENNER. Well, I think that this is a major oversight in the GAO report. I think that the GAO report has got to be viewed in the context of this fact, given the fact that the magnets are a linchpin in this.

Is that the balance of my time? Thank you.

Ms. ENGLAND-JOSEPH. Sir, I might add that no final contract has been signed. So, I mean we would not go about looking at contracts until they have been made official and signed.

Mr. SENSENBRENNER. Well, I have two other hearings that I would hope that the DOE representatives would respond to the point that you have just made.

Mr. WOLPE. Could we ask staff to check with the cloak room? There's some question as to whether there were two bells being sounded. Thank you.

Is there any further response from—okay.

Mr. Thornton?

Mr. THORNTON. Thank you, Mr. Chairman.

I would like to pursue the question of the status of the collider dipole magnets that you state in your report are untested. And in particular I would like to focus on whether you have inquired whether the breakthroughs in superconductivity during the past few years—both at the University and other institutions, including the University of Arkansas—have been considered in designing these magnets. I really think there would be, well, I was privileged as president of the University of Arkansas, to know Dr. Alan Harmon quite well, and he is the patent holder of the world's highest temperature of superconducting material, heaththallium-based material. When he invented this substance, one of the things he said it might be useful for would be in making—reducing the cost of a super collider. And of course he was also talking about levitating trains and things like that, some of which may—including this one—may not be feasible, it may be far out of the spectrum—but has any consideration been given to the great advances of the University of Houston and other institutions in elevating the temperature at which superconductivity occurs?

Ms. ENGLAND-JOSEPH. Sir, I would have to defer that question to the SSC people, they would be able to respond much more directly to your question.

[The information follows:]

Like everyone involved with superconductivity, we have been closely following the work on high temperature superconductors. Serious thought has been given to its possible applicability to the SSC. Unfortunately, the stringent requirements for producing magnetic fields needed for the SSC preclude, in our estimate, for at least the next decade, the use of high temperature superconductors. These performance requirements include: high current carrying capacity at 7 Tesla, mechanical strength and robustness, fabricability into kilometer long continuous lengths with fine filaments, production of hundreds of tonnes of cable per year at reasonable costs, and low persistent current and hysteresis effects.

There is a possible application of high temperature superconductors to the SSC project which we are investigating—the leads which connect the cold magnets to the room temperature power supply. The SSC Laboratory has a contract in place with a small business to develop low current (100A) leads fabricated from high temperature superconductors for use with the corrector magnets.

It should be noted that a change to high temperature superconductors would not necessarily reduce the price of the SSC. Liquid helium is still needed to achieve the required high vacuum, and the new high temperature superconductors would likely still have to be operated at liquid helium temperature in order to carry the high currents required. The present conductor, niobium titanium, has been optimized over the past 30 years and is very suitable for the winding of accelerator magnets because it can be bent easily and without damage.

Mr. THORNTON. I would appreciate, Mr. Chairman, if we would determine, whether the recent advances in superconductivity have been given any consideration with regard to the design of these most expensive magnets. I hope they—that, that, has happened or that we can be assured that it is simply not feasible to, to use these

ceramic materials in this kind of application. But, I would like to have a response to that question.

Mr. WOLPE. Okay. Thank you very much, Mr. Thornton.

Delighted to have join us, the ranking member of the full committee, Mr. Walker, the gentlemen from Pennsylvania. Are there any questions you would care to pose at this point?

Mr. WALKER. Not at the present.

Mr. WOLPE. Okay. The bell that you have heard signals the secret ballot that's in the Democratic Caucus on election of the committee chairman so I am afraid we must recess for a few minutes and then we'll resume this hearing. At this point, I believe that we—is there any other member that would have any questions of GAO witnesses before I do that, so we might submit them.

Mr. BARTON. I would—I wanted to ask some questions, Mr. Chairman, but I can certainly wait until full committee gets back.

Mr. WOLPE. Okay, why don't I—why don't we do that, then.

The hearing will recess.

[Recess.]

Mr. WOLPE. The hearing will resume. Mr. Barton, Mr. Boehlert advised me he has one other very brief series of questions that he would like to pose first, then we will turn to you.

Mr. BARTON. No problem.

Mr. WOLPE. Mr. Boehlert.

Mr. BOEHLERT. Yes, I would like to ask, you're familiar with the Isabelle Project.

Ms. ENGLAND-JOSEPH. Yes, sir.

Mr. BOEHLERT. And that failed and—what was the primary reason that, that project failed in your understanding?

Ms. ENGLAND-JOSEPH. It's our understanding that the project failed because of the inability to produce the magnets in a way that would allow them to operate in the accelerator.

Mr. BOEHLERT. In accord——

Ms. ENGLAND-JOSEPH. And as you know the construction of the tunnel had been completed basically by the time they discovered that those magnets could not work.

Mr. BOEHLERT. And so do you have any estimate on the dollar involvement for the Isabelle Project?

Mr. ARIMA. About $200 million was spent.

Mr. BOEHLERT. So that was a modest loss, relatively speaking. Well, you said—we're talking about string tests and you talked about the 20 percent maybe testing—that sort of concerned me because you have to have all 8,600 magnets working precisely in order for this project to succeed. So I can think that we could make a good case that all should be tested rather than just a small percentage because isn't it true that if, if you had all 8,600 magnets in place and 1 failed, then everything would come to a standstill?

Ms. ENGLAND-JOSEPH. Right, yes.

Mr. BOEHLERT. And we don't have any method right now that's known or at least that's been revealed to me, for determining how we would determine which one of those 8,600 magnets had failed.

Ms. ENGLAND-JOSEPH. That's the biggest problem of all, finding out which one's not working.

Mr. ARIMA. I think they're planning to test segments. Once the magnets are installed there will be a segment of about 60 dipoles

that would run, but they would still have the problem of identifying which one of those 60 didn't work and if they have a similar experience to HERA where you have a five percent failure rate, you'd loose about three magnets and you'd have to find out which three, pull them back out of the ring and then fix them or replace them.

Mr. BOEHLERT. That is a challenging task. One last question and I know we have others to go to. There's the rush on the part of the advocates to start constructing a tunnel under the theory that you need a tunnel to test the magnets. We already have an existing tunnel taxpayers paid a ton of money for, it's at Brookhaven. Why can't we test magnets in that tunnel in Brookhaven?

Ms. ENGLAND-JOSEPH. That, the tunnel is just a—it's not the same as the tunnel they're planning to build for the SSC and so to test it in a tunnel that's not similar in size and scope as the SSC tunnel just wouldn't allow it comparable environment for test.

Mr. BOEHLERT. Okay. Thank you.

Mr. WOLPE. Mr. Barton.

Mr. BARTON. Thank you, Mr. Chairman. First of all I just want to say for the record, I don't think there's anybody that would claim to be a more avid supporter of the SSC so I come at this from an obviously proactive standpoint.

Having said that, I would like to state on the record that the GAO report that we've been referring to, "Status of DOE's Superconducting Super Collider," I think is, is pretty straight forward and fairly well done. I mean the questions that you raised are common sense questions. Most of the conclusions I agree with. I think we need a permanent team in place. I think we need to really look at the magnets. So, you know, I'm not—I don't think this is a, a bad piece of work.

Now, just for the record, I do want to ask some questions though, about the report and my first question would be, who actually worked on the report. I would assume that the gentleman and the lady on either side of you are the, are the people that did the work. Is that correct or incorrect?

Ms. ENGLAND-JOSEPH. Yes, sir. That's correct.

Mr. BARTON. Okay, and could we have, for the record, what their background is?

Ms. ENGLAND-JOSEPH. We'd be happy to submit that. Would you like their titles and then submit their backgrounds for the record?

Mr. BARTON. Well, primarily I'd be interested—yes, Ma'am, but I'd be interested in knowing if they have a, a technical background.

Ms. ENGLAND-JOSEPH. I'll allow each of them to speak in terms of their own personal background but the way we approached this job was not to look at it from a technical perspective.

Mr. BARTON. I'm just asking for the—because some of the questions that are raised are obviously technical questions and, and just for example, do either one of them have an engineering background or a physics background, anything like that?

Ms. ENGLAND-JOSEPH. No, sir.

Mr. BARTON. Okay. What, what, what is their education background?

Mr. ARIMA. I'm an accountant.

Mr. BARTON. Accountant? And the other—the young lady?

Ms. POLLACK. I have a liberal arts degree.

Mr. BARTON. Liberal arts, okay.

Now, on the question of the magnets themselves, are— did the— which, which individual actually did the magnet part of the, of the report?

Ms. ENGLAND-JOSEPH. You mean the actual visiting of the DESY Plant in Germany?

Mr. BARTON. Well, just in general, the entire magnet.

Ms. ENGLAND-JOSEPH. Both, staff.

Mr. BARTON. Or was it, was it a team—it was a collaborate effort?

Ms. ENGLAND-JOSEPH. We work as a team and we use experts outside. We——

Mr. BOEHLERT. Okay.

Ms. ENGLAND-JOSEPH. It's a collective effort.

Mr. BARTON. Could, could they comment on the actual test results of the full-length 40-millimeter magnets that have been built and tested to date?

Ms. ENGLAND-JOSEPH. At the Fermi Lab? Those——

Mr. BARTON. Yes.

Ms. ENGLAND-JOSEPH [continuing]. 40-millimeter—can you comment on them?

Ms. POLLACK. Could we comment in what way?

Mr. BARTON. Well, my information is that those test results have actually gone fairly, fairly——

Ms. ENGLAND-JOSEPH. Successfully?

Mr. BARTON [continuing]. Successfully. Would you dispute that or accept that?

Mr. ARIMA. We'd accept that.

Mr. BARTON. Okay, you would accept that. It's also my understanding that the decision to change the magnet design, the aperture design, from 40-millimeters to 50-millimeters, was a decision to make the design more reliable and to also make sure that it could be replicated in an industrial situation. That in fact, it's easier to produce and easier to maintain. Would, would you accept that conclusion or dispute that conclusion?

Ms. ENGLAND-JOSEPH. I think a key point that I'd like to make is that we don't question the size of the magnets at all. We don't question the technical design of the magnets. We don't question the test that's associated with the 40-millimeter magnets.

We're basically looking at cost and schedule and the management approach associated with the project.

Mr. BARTON. I understand that, but several of my panel members here have raised a very valid question that—as the largest single cost component of the program, we have to have magnets that work. We have to have magnets that are delivered on time. It is my understanding that the decision to change the magnet design—which has been the subject of some concern—was done for the very purpose of making sure that the magnets actually would work as designed and could be manufactured industrially and delivered on time and everything that I've been led to believe is that, that was the proper decision and that the tests that have been done since then have verified that.

Ms. ENGLAND-JOSEPH. Sir, we will not know if they work until they're delivered, they're built and they're put in operation. So, any decision that's made may be the right decision. I think that's why we're stressing to test and to assure ourselves that we're going about this——

Mr. BARTON. Well, could the—could either one of the people that actually did the report comment or are they aware that the, the first magnets that have been built for the 50-millimeter aperture design have actually tested better than expected? Is that a true statement or a false statement or are you not aware?

Ms. POLLACK. These are the model magnets, they're not the full-sized magnet.

Mr. BARTON. I, I understand that, but they're the, they're the, they're the, they're the magnets that actually prove the design before you go to build the, the, the long magnets. So you——

Mr. ARIMA. What we've read is, yes they——

Ms. POLLACK. We've read that, yes.

Mr. BARTON. Like seeing——

Mr. ARIMA. Like I say, we don't have technical basis to make a judgment.

Mr. BARTON. Mr. Chairman, I would like to ask for the record that those test results be made a part of the record. I would also like to ask for the record that if the subcommittee chairman feels it's important enough, that the actual scientists that have conducted those tests be allowed to, to testify as to those results.

The CHAIRMAN. Well, we can certainly have the test results provided as part of the record and we can invite the—any questions that we have, we can certainly submit in writing to the scientists and——

Mr. BARTON. Okay, thanks again.

Mr. WOLPE [continuing]. Solicit their response for the record.

Mr. BARTON. I would now like to ask a question or two about the management of the project. I agree, as I said earlier, that we need to get a permanent Director of the SSC Office. I think we need to get a permanent Director of Energy Research.

But I would like to point out that the laboratory director, Dr. Roy Schwitters—he is reputed to be one of the most outstanding scientists researchers in this Nation.

I would like to also point out for the record, for the record that Mr. Joe Cipriano, who has been the project manager on site for over a year now, has direct access to the Secretary of Energy, direct access to everything that's done at the laboratory. And before coming to that position, he was head of, I believe, all Naval research and procurement, responsible for many of the weapon systems that performed so, so wonderfully in the Persian Gulf.

I would also like to point out for the record that Mr. Ed Siskin, who is the construction manager on-site for the project, has got an extensive background in managing large projects— was recruited specifically for this job and is noted in this country to be one of the leading experts in managing large projects.

Would either of the people that, that did this report care to comment on the qualifications of those individuals or any of my, my descriptions of them.

Ms. ENGLAND-JOSEPH. We have not—we do not question any of their credentials, sir.

Mr. BARTON. Okay. Has, has my——

Mr. WOLPE. Thank you very much. Let me thank all of our witnesses, GAO witnesses this morning for their testimony.

I'm sorry. Did—are there other questions that—Mr. Hall, did you have an additional question?

Mr. HALL. Well, I guess I'm really just here to help out with the voice voting but I would ask that——

[Laughter.]

Mr. WOLPE. I'm sorry.

Mr. HALL. I do have just a question, if I might ask it.

Mr. WOLPE. You certainly may, more than one.

Mr. HALL. I guess I would ask you if—are you working the contracts and how closely do you monitor the contracts?

Ms. ENGLAND-JOSEPH. As it relates to the SSC itself, we had not done audit work looking in detail at those contracts. It's our understanding as late as yesterday, that those contracts have not been signed or completed. And at this point we haven't been requested to look at them.

Mr. HALL. But you say your basic purpose to look at the cost and schedules?

Ms. ENGLAND-JOSEPH. In the report that's been referred to this morning, we were basically looking at the German experience and also providing an historical perspective in terms of cost estimates for the SSC, strictly an informational report to try to describe the process that's been followed and the only other experience that's available out there from, for which we can make any sort of comparison.

Mr. HALL. And there are to be about 1,600 quadrupoles and about 8,500 dipoles? Is that——

Ms. ENGLAND-JOSEPH. Total is about 10,000, 8,600 dipole.

Mr. HALL. I may have been misinformed but I'm under the impression that, that there's either contracts under the rubber—about to be awarded for the final design and initial production of the quadrupole magnets. Is that—do you have that information?

Ms. POLLACK. Their—they've selected Babcock and Wilcox to begin negotiations with——

Mr. HALL. You following that?

Ms. POLLACK [continuing]. For the quadrupole.

Mr. HALL. You all are following that I presume?

Ms. ENGLAND-JOSEPH. Not as a part of ongoing audit work. No, sir. It's just, we have that knowledge because of the current work we've just done.

Mr. HALL. But you certainly have interest in it.

Ms. ENGLAND-JOSEPH. Yes, sir.

Mr. HALL. And, would it be important to you to know that the contract would be awarded ahead of schedule and significantly under budget? Would you be interested in that or would you include that in your testimony if you knew it.

Ms. ENGLAND-JOSEPH. If it was of interest to the subcommittee then we would certainly provide that type of information. We've not tried to limit the information we've provided to the Committee at all.

Mr. HALL. What is your conclusion in your testimony here? Can you wrap it up for me in a sentence or two?

Ms. ENGLAND-JOSEPH. I guess a word of caution as it relates to the production of the magnets themselves because we have experience that we can look upon with Germany, even though it is quite different in terms of size of the tunnel and number of magnets and the size of the magnets, it's the only other experience that we have where industrially produced magnets have been produced, and at least at this point, through tests, have worked. Although, by the way, that entire HERA accelerator has not actually been put into final production.

Mr. HALL. Then you're really saying that the—be cautious because the risks of the project are high since it's never been done before.

Ms. ENGLAND-JOSEPH. Yes, sir.

Mr. HALL. Jack Kennedy found himself in that same situation when he heard the beep-beep of Sputnik, didn't he? Did he not?

Ms. ENGLAND-JOSEPH. He probably did.

Mr. HALL. Would you have told him, "Wait Mr. President, don't go forward, the risks are high"?

Ms. ENGLAND-JOSEPH. I wasn't there at the time, sir, and I don't know what information was available to have that statement.

Mr. HALL. You were in, about in the 5th grade, weren't you? [Laughter.]

Ms. ENGLAND-JOSEPH. Yes, sir.

Mr. HALL. Would you also tell them the risks are high and the expenses great, quit looking for a cure for cancer?

Ms. ENGLAND-JOSEPH. No, sir, and I think you're pointing out a very important point. We're not questioning at all the merits of the SSC. That's——

Mr. HALL. That's all I have and I thank you. That's what I wanted to hear you say. [Laughter.]

Ms. ENGLAND-JOSEPH. That isn't what—that is not what the audit work——

Mr. GEREN. Would you yield for one question?

Mr. HALL. Yes I do.

Mr. GEREN. Just to complete the question by Mr. Barton, I guess the three of you were the primary workers on this project?

Ms. ENGLAND-JOSEPH. Yes, sir.

Mr. GEREN. And what was your background, I—we heard that he's an accountant and she's a liberal arts major and what's your background?

Ms. ENGLAND-JOSEPH. It's business and financial management.

Mr. GEREN. Alright, thank you.

I yield back to the gentleman from Texas.

Mr. HALL. Thank you. Mr Chairman, I yield back my time.

Mr. WOLPE. Again, let me express my appreciation to the witnesses. This will conclude this portion of today's hearing and we will turn to our second panel of witnesses from the Department of Energy.

Mr. WOLPE. Testifying on our second panel this morning will be Mr. Gary Gibbs, the Acting Associate Director, the Office of Superconducting super collider, The Department of Energy. He will be

accompanied by Mr. Joseph Cipriano, Dr. Roy Schwitters, Mr. Edward Siskin, Mr. Thomas Bush and Mr. Bobby Scarlett.

Let me invite all of those who will be sharing in the testimony this morning to rise. Please stand and raise your right hand.

[Witnesses sworn.]

Mr. WOLPE. Mr. Gibbs, we invite you to proceed with your testimony. After that, we will return to questions.

STATEMENT OF GARRY W. GIBBS, ACTING ASSOCIATE DIRECTOR, OFFICE OF SUPERCONDUCTING SUPER COLLIDER, DEPARTMENT OF ENERGY, ACCOMPANIED BY JOSEPH CIPRIANO, EDWARD SISKIN, THOMAS BUSH, ED TEMPLE, AND BOBBY SCARLETT

Mr. GIBBS. Thank you, Mr. Chairman.

I welcome the opportunity to be here today to discuss with you many of the issues that you've been raising earlier this morning in your statements in earlier testimony by the GAO. I'd like to make a few oral comments if I may and then submit my formal statement for the record.

Mr. WOLPE. Your formal statement will be included in its entirety in the record.

Mr. GIBBS. Thank you. With me—I'd like to introduce the key individuals that we have here at the table as well as the other witnesses from the Department. On my left is Ed Siskin, the General Manager from the SSC laboratory. On the right is Joe Cipriano, the DOE Project Director on site in Texas. And to his right is Tom Bush, the Magnet Systems Division at the laboratory. We also have Mr. Ed Temple from the Department representing Energy Research and Bobby Scarlett from the Department representing the Independent Cost Estimating group.

Mr. WOLPE. Pleased.

Mr. GIBBS. First of all, as noted by Congressman Hall, we all agree. I think that SSC is very important and that's why we're here to discuss where we are with the project as well, as what or how we move forward with it.

The Administration, I think, has stressed the importance it places on the SSC with the fiscal year 1992 budget request totalling $533.7 billion, million, I'm sorry, for fiscal year 1992. This is a significant ramp up in this fiscal year. It is the year that we need that ramp up from a construction project point of view, to move forward in a concerted fashion with the baseline schedule on cost that we've outlined in the SSC cost report.

Let me just note further that in that budget we are—in addition to that budget request, the Federal dollars we're expecting as outlined in the cost report—$130 million of Texas money for fiscal year 1992. And we're estimating something on the order of $20 million in fiscal year 1992 for foreign contributions. This is critical, this increase, this ramp up match is critical in several ways in moving forward with the SSC.

First we think it's cost effective. We've done a very careful job and we're here to discuss that today as to establishing a baseline, or schedule of the project elements that go into that and a profile that goes with that. And so we think we've presented to you an ef-

fective and a very credible baseline. We've—secondly, the request and the ramp up that I've mentioned represent a strong position on the part of the Administration that this is necessary to be done and this is the right time to do it.

And I think finally, something that we cannot lose sight of is that in the area of this country moving forward with the SSC, it's important that our potential foreign partners see that movement so that they know that we are committed and moving forward at a national basis so that they know there's something serious—to join in with us when we talk to them about their possible participation. The other point that I'd like to make is that—which was the activities outlined for fiscal year 1992—the completion of what we have underway in 1991 and moving into 1992, we feel we will have put the project on a very firm basis from the point of view of having it basically established and demonstrated in hand the key cost elements of the project. The magnet performance we'll have done the accelerator system string test and the accelerators for the injector will be in final stages of design with major components under development and being tested. We'll have substantial geotechnical results for the tunneling activity that will be underway, or that will be starting in the last quarter, as well as the large scale detector concept should be in hand, and approved and so that we can move forward with building those.

So, by the end of the fiscal year of 1992, once we've conducted string tests and are ready to begin the major tunneling activities, we should have all the key information on technical system performance, collider ring tunneling and detectors, to confirm that what we are presenting to you today—and that was released the first of February—is a valid and real baseline estimate for the project, both compared to the schedule and cost.

I want to just comment that there are a number of accomplishments that are very significant in contrast to a year ago when the fiscal year 1991 was presented to the Congress and that the baseline, as well as what we're planning for fiscal year 1992, are predicated on a strong set of accomplishments.

First of all, we do have the architect engineering and construction management contractor on-board with this at Parksons and Brincerhoff and Morrison Knudsen. Again, we'll comment more on this as we go through with you, the questions you have, but that contract's on schedule and within the baseline budget.

The General Dynamics and Westinghouse contracts have been negotiated by the laboratory. They're in the headquarters for approval. They've been signed off by the Laboratory and forwarded by Mr. Cipriano to the headquarters for final approval and we'll discuss with you activities that are underway there.

Footprint has been approved about this time last year, and land acquisition begun by the State of Texas—began that acquisitions ahead of schedule. We have conventional construction—not even development of laboratory—underway at the West Campus site. And as mentioned earlier, we've also had very successful testing with the 50-millimeter magnet design, the short 1.8 meter model and have every confidence that will lead us to a successful testing of the long magnet.

So, I think in summary, the cost of and schedule baseline that we've presented to you,—one, it maintains the science objectives of the SSC, is specific to the test site and it is an improved design over that was conceptualized back in 1986, more conservative.

And we have—we're validating many, if not all, of the cost elements, as I mentioned in the fiscal years 1991 and 1992 timeframe. I—we think it establishes that—a firm basis to move forward with the project and the Department and the Laboratory are committed to doing that and executing to this baseline. Full project cost presented is $8.2 billion. This is in contrast to the $5.9 billion that was on the initial fiscal year 1990 budget request against which the initial construction funding was approved and appropriated.

When the Secretary was up here last year, he identified that we did have some design revisions that we were contemplating, that had been recommended and proposed by laboratory and that, could raise the cost by $1 billion to $2 billion at that time. We've subsequently, as you know, and as is outlined in detail in the cost and schedule baseline report, gone through an extensive review and reconciliation process that we'll be discussing here today, to arrive at this $8.2 billion cost estimate that we have for you. And the last thing I think I'd like to comment on is that the—in addition to these accomplishments, part of the reason we're seeing these accomplishments coming in the way they are is that we do, we believe, have a strong management team in place, both at the laboratory and on-site and with in the Department. We have the decision authority and we have the right technical capabilities where we need it to make—bring this project in successfully.

The remaining challenges I'm sure we'll be discussing shortly—is also in the baseline cost report we've outlined of that $8.2 billion, the Administration's goal is to obtain one-third of that from non-Federal contributions. That one-third corresponds to about $2.7 billion in total dollars.

The Texas commitment as part of an existing Memorandum of Understanding with Texas, is for $875 million that directly offsets that $8.2 billion which leaves $1.6 billion for foreign contributions. And we will outline for you—and have done so in some of the questions that you provided before the hearing—where we are in terms of what actions have been taken and the status of a number of government-to-government level activities that are underway.

Thank you.

[The prepared statement of Mr. Gibbs follows:]

Statement of Garry W. Gibbs

Acting Associate Director

Office of Superconducting Super Collider

U.S. Department of Energy

before the

Subcommittee on Investigations and Oversight

of the

Committee on Science, Space, and Technology

U.S. House of Representatives

May 9, 1991

Mr. Chairman and Members of the Subcommittee:

I am pleased to have the opportunity to testify before the Subcommittee on the Department's Superconducting Super Collider (SSC) program.

The SSC is a key part of the Administration's initiative to strengthen the position of the Nation as a world leader in science and technology. It is the largest basic science project in the history of the Department. We recognize that effective management of such a large, complex endeavor is an important responsibility, and we are ready to meet the challenge. I will indicate the substantial progress we have already made and the plans we have to ensure that the SSC is completed on schedule and within cost. We are confident that the SSC will be a world-leading facility for basic research at the very frontiers of knowledge about the basic structure of the universe and how it operates, and that it will yield important discoveries and technological innovations that will likely affect major technological directions in the 21st century.

Already high energy physics research related to the SSC has industrial applications in several areas: supercomputers, plastics, electronics, fiber-optics, nuclear medicine, and data processing. Superconducting magnets alone represent a $200 million per year industry and are being used in over 2,000 hospitals for Magnetic Resonance Imaging.

There has been substantial progress on the SSC since the selection of the Ellis County, Texas, site and formation of the SSC Laboratory early in 1989 and the appropriation of first construction funds in the FY 1990 budget. Under the leadership of Dr. Roy Schwitters and the Universities Research

Association (URA), the management of the SSC Laboratory was substantially strengthened last fall with the appointment of Mr. Ed Siskin, who has 28 years of experience in the management of large projects, to the new position of General Manager, and the appointment of Mr. Paul Reardon, who is recognized worldwide for his experience in management of the design and construction of particle accelerators, as Project Manager. Earlier, the Department established an On-Site Project Office, headed by the DOE Project Director, Mr. Joseph Cipriano, who has extensive large project experience and was the top civilian in the Naval Sea System Command. A very strong DOE and Laboratory management team is now in place with a combination of major construction and technical project experience and resources to ensure that the SSC is built to the cost and schedule baseline.

This experienced team has already made its presence felt and is having a direct impact in bringing the following accomplishments in on schedule and on or below budget. Major accomplishments include: (1) award of the contract for SSC architect-engineer/construction management (A-E/CM) services to the team of Parsons-Brinckerhoff/Morrison Knudsen; (2) completion of the Supplemental Environmental Impact Statement and Record of Decision for construction and operation of the SSC; (3) completion of a Memorandum of Understanding with the State of Texas that outlines the principles that will govern the interaction between the Department and the State of Texas regarding its participation in the SSC project and its contribution of land and $1 billion; (4) transfer of initial land parcels to the Federal Government by the State of Texas as part of the land acquisition program by the State, which is running well ahead of schedule; (5) initiation of on-site construction of the

Magnet Development Laboratory, which will be completed and in operation this summer; (6) selection of General Dynamics and Westinghouse, respectively, as leader-follower contractors for the collider dipole magnets; (7) selection of Babcock and Wilcox Company for the design and initial production of the collider quadrupole magnets; (8) identification in January 1991 of two large, general purpose detectors (the Solenoid Detector Collaboration and L*) for further design, with both detectors including major participation by foreign scientists. I must note that the SSC Laboratory has just determined that it is not possible to proceed with L* as proposed by the leaders of the collaboration. The SSC Laboratory will begin discussions immediately with members of the L* collaboration and others to discuss the formation of a new international collaboration which we are confident will result in a second large, complementary detector; (9) completion of the "Report on the Superconducting Super Collider Cost and Schedule Baseline," which I will discuss in depth later; and (10) establishment of a strong laboratory presence in the Waxahachie area in the SSC Central Facility recently acquired for the project by the State of Texas.

In the area of magnets, we are moving ahead aggressively with the design and development of the superconducting magnets for the collider. The superconducting dipole magnet industrialization program is underway with General Dynamics and Westinghouse selected for transfer of the magnet technology from the laboratory to industry. Contracts for these activities have been negotiated by the SSC Laboratory within the baseline budget, and awards are in the final approval process within the Department. This transfer will involve the design, tooling, fabrication, and assembly of prototypes and

pre-production units leading to a competition and fixed-price award of production contract(s) for the more that 8,000 magnets needed for the collider.

The design of the 50-mm aperture dipole magnets is completed and six short, 1.8-m model magnets have been built and tested with very good results in terms of both operating current and field quality. Tooling for the full-length magnets has been obtained and fabrication and assembly are beginning at Fermilab and Brookhaven for the full-length prototype magnets to be used for the Accelerator Systems String Test (ASST) in late FY 1992. In the meantime, tests with two, 40-mm full-length dipole magnets, connected in series, were completed in March and a string of five dipole magnets will be tested at Fermilab in the summer of 1991.

A contract has just been negotiated with Babcock and Wilcox to complete the detailed design and to build prototypes of the superconducting collider quadrupoles. This contract is ahead of schedule and below the cost estimated in the baseline for this activity.

Overall, we are making excellent progress with the superconducting magnet development program and look forward to completing the ASST milestone in late FY 1992.

Let me now summarize the status of the other major contracts in addition to the magnet contracts mentioned above. In January 1989, the Department awarded a contract to URA to be the management and operating contractor for the

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design, construction, and operation of the SSC, and for the establishment of the SSC Laboratory. Such contracts are customary to prescribe the relationship between the Department and its operating contractors. In January 1991, URA entered into a contract with Parsons-Brinckerhoff/Morrison-Knudsen to provide A-E/CM services to oversee the design and construction of all on-site facilities such as tunnels, surface structures, utilities, and site infrastructure. There will be numerous other contracts awarded by Parsons-Brinckerhoff/Morrison-Knudsen under this subcontract.

In the area of international participation, the Department has been quite active over the past year. Last spring, a plan entitled, "A Framework for International Participation," was published. This plan was developed in cooperation with the Office of Management and Budget, the Office of Science and Technology Policy, the National Security Council, the National Science Foundation, and the Commerce and State Departments, as well as with other appropriate agencies within the Executive Branch. The plan set out international objectives, a policy and regulatory framework in which international negotiations will be conducted, and an overall strategy for establishing appropriate international agreements. This strategy is built on the experience of the U.S. High Energy Physics program in international cooperation and the experiences of other major research laboratories in Europe and Japan.

International participation in the SSC is built on a partnership concept of equity participation and true partnership in both the construction and operation of the SSC. The State of Texas, as a major contributor to the SSC

project, is already working with the Department as the first major partner. Active discussions are underway with several potential foreign partners to develop specific proposals for participation and to begin negotiating government-to-government agreements on the magnitude and type of contribution.

Last May and June, Deputy Secretary Moore led a formal delegation to Japan and South Korea with a letter of invitation from President Bush to join with the U.S. Government in the SSC project. Subsequent discussions have continued at various levels with both Japan and South Korea to explore their areas of interest. Last fall, Assistant Secretary John Easton led advance teams to Europe and Canada to outline our partnership approach and explore areas of interest. Discussions are continuing in both arenas, with particular interest on the part of Canada in becoming a significant partner, possibly even contributing a major system, as well as other materials and components. There are a number of laboratory-to-laboratory agreements with the SSC Laboratory and we are in the process of formalizing an agreement with India for its longstanding commitment of $50 million to the SSC. In addition, discussions are underway with the Soviets to explore areas for their participation, including major components and subsystems. Other nations are currently being considered as well. We are confident that significant foreign contributions to the SSC can be achieved.

In the area of detectors, two collaborations for large, general-purpose detectors had been identified by the SSC Laboratory to be supported for further design and approval, the Solenoidal Detector Collaboration and L*. These collaborations include major participation by foreign scientists and

substantial cost-sharing by other countries--again with the estimate for U.S. funds within the baseline budget. As I noted earlier, the SSC Laboratory has just determined that it is not possible to proceed with L* as proposed by the leaders of the collaboration, but we expect major U.S. and foreign participation in a second large detector.

With regard to operating costs after the SSC construction is completed, the present estimate of the annual funding requirement for FY 2000 and beyond is $380 million per year in FY 1992 dollars. This preliminary estimate is based on a projection of the operating staffing level, electric power requirements, expendable materials and supplies, staff support costs, and annual requirements for plant and facility improvements. The SSC Laboratory is currently evaluating a detailed operating scenario and funding requirements, and we expect to have a more detailed estimate by the time we submit our FY 1993 budget request to the Congress. In this respect, it would be premature at this time to identify in detail the impact of SSC operations on other accelerator programs during the early part of the next century. While each of the present high energy physics facilities has unique capabilities that will not be duplicated by the SSC, it is unlikely that the SSC program could be accommodated as a total add-on to the existing high energy physics program. While some growth in high energy physics program funding from present levels will be necessary to support a productive and balanced U.S. high energy physics program which includes the SSC, it is likely that priority choices will have to be made and that the operation of some existing facilities would have to be reduced or phased out. Detailed program planning decisions of this type should be made in the late 1990's, closer to the time of SSC turn-on; and

should be based on considerations of physics priorities, facility capabilities, and overall budgetary constraints at that time.

Now I would like to address, in-depth, what is one of the most important accomplishments of the past year, the Department's "Report on the Superconducting Super Collider Cost and Schedule Baseline," which was released in February 1991. This report represents the culmination of an extensive effort by the SSC Laboratory to develop a site-specific conceptual design, along with cost and schedule estimates for the SSC, and the efforts of the Department to thoroughly review the Laboratory's work, to reconcile differences noted by three independent review committees, and to develop a credible cost and schedule baseline for the SSC. The report carefully documents the history of the conceptual design of the SSC and the earlier cost and schedule estimates. It describes the site-specific conceptual design developed by the SSC Laboratory in 1989 and 1990, discusses the major changes from the earlier 1986 conceptual design, and discusses the methodology used in developing the SSC cost estimate. It provides a description of the Department's cost and schedule baseline along with the rationale used to arrive at that baseline.

In December 1989, the Laboratory submitted preliminary information to the Department proposing changes to the 1986 conceptual design that would likely increase the total project cost of the SSC from the previous Department estimate of $5.9 billion in as-spent dollars (i.e., including an allowance for inflation) into the range of $7-8 billion (as-spent). The revised design was specific to the Texas site, reflecting advances in accelerator and detector

design and technology, and recent experiences with magnet performance at other high energy physics facilities around the world. Specific changes included increasing the collider dipole magnet aperture diameter from 40 to 50 millimeters, increasing the collider ring circumference from 52 miles to 54 miles and a doubling of the injector energy from 1 to 2 trillion electron volts (TeV). The resulting design is more conservative and will ensure a more rapid commissioning and reliable operation of the SSC.

In light of this new information, Secretary Watkins requested a review by the High Energy Physics Advisory Panel to assess the overall scope of the SSC and the scientific potential of the facility as a function of beam energy for beam energies below 20 TeV. A blue ribbon subpanel of the High Energy Physics Advisory Panel recommended strongly that the SSC energy be maintained at 20 TeV and concluded that implementing the design changes proposed by the SSC Laboratory would ensure confidence in reliable and timely operation of the SSC. The subpanel's report was unanimously endorsed by the full panel. After carefully reviewing this advice, Secretary Watkins reaffirmed that the SSC was properly scoped at 20 TeV and that the design changes proposed by the SSC Laboratory were necessary. The preliminary estimate of a total project cost in the range of $7-8 billion was discussed by Secretary Watkins and other Department officials last year during a number of Congressional hearings on the FY 1991 budget.

In June 1990, the SSC Laboratory completed its Site-Specific Conceptual Design Report along with cost, schedule, and funding profile estimates. This documentation served as the starting point for the Department's process of

developing an SSC cost and schedule baseline. It set forth a total project cost estimate of $7,837 million (as-spent) with completion by the end of FY 1998.

In order to ensure a thorough evaluation of the SSC Laboratory's design, cost, and schedule estimate, the Department commissioned three independent reviews. These reviews included the customary reviews by the Department's program office (the Office of Energy Research for the SSC) and the Department's Independent Cost Estimating staff. To ensure a completely independent and critical review of both the Laboratory's estimate and the Department's review process, Secretary Watkins requested a third, special review by the High Energy Physics Advisory Panel.

As a result of a thorough evaluation of the cost and schedule baseline proposed by the SSC Laboratory and the recommendations and comments of the three independent review committees, the Department reconciled the major differences and developed a baseline cost and schedule estimate for the SSC. The net result of this process is a Department baseline that has increased the base cost estimate for construction and extended the schedule by one year from that proposed by the SSC Laboratory. This baseline estimate differs by less than 3.5 percent from even the highest estimate by the Independent Cost Estimating staff for base construction costs. The differences that remain are largely in the area of contingency allowances to cover estimated costs for technical uncertainties and for schedule delays that could possibly occur during the course of the project. Concerns were also expressed about the realism of the schedule and funding profile. The Department's Independent

Cost Estimating staff, in addition, raised a number of concerns about what costs should be included in the total project cost. The findings of each of the review groups are documented in the Department's SSC Cost and Schedule Baseline Report.

The Department asked the SSC Laboratory to revalidate base-cost estimates in all areas where the review committees expressed concerns. The Department reached decisions on adjustments to the base-cost estimates, the contingency allowance, a schedule extension, the detector allowance, and escalation rates. The Department established policy positions with regard to treatment of foreign contributions to detectors, Laboratory operating costs, DOE On-Site Project Office costs, and land costs. The rationale for these decisions and positions are presented in the baseline report.

The Department's baseline for the SSC identifies a total project cost of $8,249 million (as-spent), with project completion by the end of FY 1999. The detailed features of the baseline are documented in the Department's baseline report. The baseline incorporates increases to the base-cost estimate for some elements of the construction project, a schedule extension of one year to accommodate a less aggressive funding profile which was viewed as necessary due to budget constraints, and a contingency allowance of $843 million. We believe that these adjustments produce a baseline that is consistent with the advice of the Energy Research Review Committee and the High Energy Physics Advisory Panel, and takes into account many of the concerns raised by the Independent Cost Estimating staff.

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The baseline is technically feasible. It will provide a high energy physics laboratory capability that meets the scientific objectives of the SSC and that results in a facility that can be commissioned readily, while operating with high reliability. It establishes a credible total project cost estimate and an aggressive but cost-effective schedule. The baseline funding profile reflects a balance between meeting the schedule objectives of the program and the current budget constraints.

The baseline cost includes a contingency allowance of $843 million (as-spent), which should provide a more than adequate contingency envelope for effective execution of the SSC project. This contingency allowance should provide for appropriate tradeoffs and responses to any reasonable set of technical and schedule uncertainties that might arise. The extension of one year in the baseline schedule to FY 1999 provides schedule flexibility and a more prudent ramp-up of funding. The combination of the revised schedule and contingency allowance from that initially proposed by the SSC Laboratory reduces cost and schedule risks. The baseline furthermore ensures reliable and flexible operation through a more conservative design approach by the SSC Laboratory than that of the conceptual design of 1986.

I believe the Department's "Report on the Superconducting Super Collider Cost and Schedule Baseline" provides a clear and consistent picture of how cost estimates for the SSC project have evolved, the present baseline cost and schedule, and where the project is going. This report becomes the reference against which the Department and the SSC Laboratory will manage the project and report progress and status to the Congress. The Department's baseline

provides a cost-effective basis for planning and executing the SSC in a manner that will ensure that the scientific objectives of the SSC will be achieved and that it will be completed on schedule and within funding. The Department and the SSC Laboratory management are fully committed to meeting these goals. As I mentioned previously, strengthened management teams are now in place at the Department and at the SSC Laboratory. Strict, formal change control procedures are in place and the Department will retain full control of the expenditure of contingency funds.

As of the end of FY 1990, the project was on budget and on schedule. Experience to date in FY 1991 continues to give us confidence that we can control the cost and schedule for the SSC. Additional opportunities for cost savings are being explored. The architect-engineer/construction management contract and leader/follower contracts for the collider dipole magnets have been negotiated below estimated baseline costs. The SSC Laboratory just recently selected the contractor for the superconducting quadrupole magnets, again below cost and ahead of schedule. In addition, the State of Texas has purchased an existing facility near Waxahachie for use as SSC office and laboratory space at an overall savings to the project of $10 million. All major project activities are on, or ahead of, the baseline schedule, and we expect that other on-going activities can lead to further cost savings.

In closing, I must note that the cost and schedule estimate presented in the Department's baseline is intimately linked with the funding profile indicated. Any change in funding profile will have an impact on schedule and total project cost. Receipt of funding as indicated in the baseline funding profile

will enable the Department to execute the project as estimated, with confidence that we can control the project so that there will be no cost overruns or schedule delays. Receipt of this funding is also important to give confidence to potential foreign contributors that the project is on a sound track and that their commitment is timely. Any reduction in funding means delay, affecting the ultimate cost and success of the SSC.

Fiscal Year 1992 is a critical year with a significant increase in Federal funding to $533.7 million, as indicated in the Department's FY 1992 budget request. This increase is key to getting critical project activities underway in FY 1992. The activities in the balance of FY 1991 and FY 1992, culminating in the completion of the accelerator systems string test in the fourth quarter of FY 1992, will validate the key cost elements in the baseline estimate, particularly in the areas of tunneling and conventional construction, accelerator design, and superconducting magnets.

That concludes my statement. I would be happy to answer questions.

Mr. WOLPE. Thank you very much, Mr. Gibbs. Just one question about the letter from Admiral Watkins that was referenced at the onset of this hearing. Do you have any disagreement with GAO's response, that they did meet with the Department of Energy and in fact discussed their report?

Mr. GIBBS. Yes, let me comment on that because I think it's a communication thing as much as anything. The GAO did meet with myself and others during the—early on, before this was issued. They—we had a draft which was an initial draft, it was not a complete draft, comments were provided to them on what we thought were either statements of clarification of fact and or what we thought were possibly misstatements as to what it would not represent. What I believe the Secretary is referring to there is his consternation, is that we—you don't see how those comments are included or incorporated and you have no chance to make a formal comment on, either the statement of facts as they're finally represented or the way in which they're representing the conclusions that are drawn.

The CHAIRMAN. That's a standard operating procedure, is it not? Even under formal response the Department is not presented with the conclusions, it is only presented with the statement of fact. Let me ask consent to introduce in the record at this point, the memorandum from you, Mr. Gibbs, to the Executive Assistant to the Deputy Secretary and the Acting Director of the Office of Energy Research, and read to you what this memo says.

[The memorandum dated February 12, 1991, Subject: GAO Draft Report on Statement of Facts, follows:]

DOE F 1325.8
(10-89)

United States Government — Department of Energy

memorandum

DATE: FEB 12 1991

REPLY TO ATTN OF: ER-90

SUBJECT: GAO Draft Report on Statement of Facts -- Status of SSC

TO: Jay Stone, Executive Assistant to the Deputy Secretary, S-2
Jim Decker, Acting Director, Office of Energy Research, ER-1

On Friday, February 8, 1991, a GAO Exit Conference was held in my office regarding the GAO Draft Report on Statement of Facts -- Status of SSC. Attachment 1 is a summary of the GAO report based on discussion in the meeting describing the statement of fact and Department position. The GAO report is provided as Attachment 2.

Garry W. Gibbs
Acting Associate Director
Office of Superconducting
Super Collider

2 Attachments

cc:
M. Vallette, ER-621
J. Cipriano, SSCPO

ATTACHMENT 1

GAO Draft Report dated 2/7/91

ISSUE: P.1, 4th paragraph. "The SSC will be built through a geological formation that has many risks and uncertainties associated with it because of its high potential to expand and contract."

STATUS: Rewording Suggested:

"The SSC will be built through a geological formation that has little risks associated with the tunnels but the construction of experimental halls in the Eagle Ford Shale has uncertainties due to its high potential to expand and contract."

Background

The three formations that the tunnel and experimental halls will be in (Austin Chalk, Taylor Marl, Eagle Ford Shale) are well understood from many years of tunneling and excavation in the region. Specific information on the site's geological properties has been provided by the State of Texas drilling program consisting of 38 borings and the SSC Laboratory drilling program consisting of more than 100 borings.

Core samples, laboratory data, and geophysical data prove that lithologic variations within each unit are minor and the basic engineering and tunneling properties are homogeneous, thereby reducing the risks and uncertainties to highly acceptable commercial tunneling conditions.

ISSUE: P.1, 4th paragraph, 2nd sentence. "To better understand the geology, the SSC Laboratory plans to construct a section of the SSC tunnel."

STATUS: Rewording Suggested

"To better understand the geology, the SSC Laboratory has conducted an extensive geotechnical characterization program."

Background

To gain more specific data on the physical properties of the Eagle Ford Shale that affects large underground halls the size of football fields, the SSC Laboratory plans to construct and instrument a large diameter drill hole on the west campus at the site of one of the interaction halls that would be in the Eagle Ford Shale.

ISSUE: P.2, 2nd paragraph. "Although Texas' September 1987 proposal for siting the SSC in Texas pledged to contribute $1 billion toward the SSC, under a memorandum of understanding with DOE, Texas has only agreed to contribute up to about $700 million for construction. While the precise use of the funds has yet to be determined, portions of that $700 million are tentatively planned for activities indirectly related to the SSC construction. The remaining $300 million was pledged toward reducing the cost of electricity and for SSC related research and development."

STATUS: The Memorandum of Understanding with Texas refers to "$1 billion, plus land, pledge of support to the SSC." The GAO correctly references the original Texas offer; however, there have been additional agreements that provide more detail on this $1 billion contribution as outlined in the "Report on the SSC Cost and Schedule Baseline." Texas is now committed to contribute $875 million to directly offset costs within the total project cost (TPC). In addition they have set aside $125 million for R&D, infrastructure, socioeconomical, and educational programs that will be outside of the TPC. Part of the $125 million could become available to offset further costs within the TPC if required.

ISSUE: P.2 "The development schedule for the collider dipole magnets is compressed and as such, increases the risk for the magnets because little time will be available to resolve any problems which may be encountered."

STATUS: The concurrency of the design and prototyping activities is desirable to efficiently optimize the magnet design on the basis of test results. Similarly, early use of production tooling, via the concurrency of the prototyping and preproduction activities, will allow potential difficulties to be resolved more quickly than in a sequential program. Since the material quantities and costs involved are small during these stages, the possible scrap cost of the concurrency is outweighed by the expected schedule benefit--the SSC Laboratory's general operating expenses will be well over $2 million per week at this time. Such overlapping of development and manufacturing is now widely practiced in industry because it is effective in reducing time from development to installation and operation.

ISSUE: P.7, 2nd paragraph, 3rd sentence. "The drill hole, however, was canceled because of its cost."

STATUS: Rewording Suggested

"The drill hole, however, was put on hold due to its estimated cost and budget uncertainty."

Background

The large diameter hole has been tasked to the A-E/CM for initiation of preliminary design and a cost estimate prior to construction.

ISSUE: P.8, 1st paragraph, last sentence.

"However, in June 1990, the drill hole was canceled as too costly--$3 million to $5 million."

STATUS: Rewording Suggested

"However, in June 1990, the drill hole was put on hold due to its estimated cost--$3 million to $5 million--and project budget uncertainty."

ISSUE: P.8, 2nd paragraph, 5th sentence.

"The SSC tunnel section is proposed to be started in October 1991, which is before the September 1992 start date that was projected for the prototype installation facility."

STATUS: Rewording Suggested

"The SSC tunnel section is proposed to be started in the 4th Quarter FY 1992 (July 1992) which is before the September 1992 start date that was projected for the prototype installation facility."

Background

This date is in accordance with the "Report on the Superconducting Super Collider Cost and Schedule Baseline" dated January 1991.

ISSUE: P.9 "Full size 50-millimeter collider dipole magnets have not yet been built or tested."

STATUS: While the GAO statement is factually correct, it does not, in our opinion, accurately reflect the status on this issue. Four 1.8 m models of 50-mm dipoles have been completed and tested with excellent results, two at BNL, one at FNAL, and one at KEK (Japan). The first full length 50 mm dipoles will be tested in October and November 1991.

Since there have been both larger diameter and smaller diameter superconducting magnets built, the 50-mm dipole is a straightforward scaling from the 40-mm design and does not involve fundamental changes or new technologies. The Tevatron and HERA accelerators comprise eight miles of 75-mm diameter dipoles. The SSC development program has built and tested nineteen full length 40-mm dipoles. Moving to an intermediate diameter, 50-mm, is not a major step. The immediate, very successful tests of the short 50-mm magnets support this position.

ISSUE: P.10 "The [Fermilab] officials stated that because of budget limitations, a minimal amount of superconducting wire was bought for 1990."

STATUS: This is not correct. The SSC Laboratory in FY 1989 ordered more than twice the amount of superconducting wire required for the planned program in FY 1990. U.S. industry slipped deliveries, resulting in deliveries of only about 150 percent of the required amount. An additional 50 percent of the wire, that was wound into 40-mm coils, was damaged during winding. Thus, there was a tight supply of cable in FY 1990, but not because of budget limitations.

ISSUE: P.10 "The HEPAP Subpanel stated that the schedule is "extremely optimistic" and recommended adding six to twelve months to the early part of the present schedule to, among other things, reduce risk in the magnets. In response to the HEPAP recommendation, the SSC Laboratory added five months to the time for industry delivery of the first production magnets."

STATUS: The DOE baseline extended the overall project schedule by a year in response to concerns about schedule risk and the rapid buildup in the funding profile.

The SSCL carefully reexamined the magnet schedule and determined that the referenced five months extension was appropriate in the magnet area.

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ISSUE: P.11 "Thus, the SSC Laboratory went out for bids even before Fermilab began building the first model 50-millimeter magnet in October 1990."

STATUS: The Request for Proposal (RFP) sent out by the SSCL was for engineering design and development of the 50-mm dipole magnet; it is not a fixed-price production contract. In any case, there has been substantial progress in the 50-mm design since the RFP was released in July, with four short (1.8 m) models being very successfully tested. While it is important to achieve maximum progress in the national laboratories to feed into the General Dynamics effort, General Dynamics will have design responsibility for the 50-mm dipoles. Thus, there is no benefit to wait for Fermilab to build the first full length 50-mm magnet before initiating the contract with General Dynamics.

ISSUE: P.13, 3rd paragraph. "According to the Commission's cost projection, about $239.2 million has been budgeted to the SSC for the Texas contribution for fiscal year 1991. Of the $239.2, about $126.5 or 52 percent is budgeted for construction activities. Other items budgeted for include, among other things, $75.9 million for land purchase, $15.4 million for research and development, and $16 million for infrastructure other than the SSC construction."

STATUS: We note that the subparts identified by GAO add to a total of $233.8 million. The $239.2 million total indicated is consistent with the expected contribution of $149 million to offset costs within the TPC plus expected contributions to land and R&D activities. ($239.2 million, less the $75.9 million for land and $15.4 million for R&D)

ATTACHMENT 2

GAO

United States General Accounting Office

Draft Report

Statement of Facts

Status of SSC

Notice:
This Draft Is Restricted to Official Use.

This draft report is being provided to obtain advance review and comment from those with responsibility for the subjects it discusses. It has not been fully reviewed within GAO and is, therefore, subject to revision.

Recipients of this draft must not, under any circumstances, show or release its contents for purposes other than official review and comment. It must be safeguarded to prevent publication or other improper disclosure of the information it contains. This draft and all copies of it remain the property of, and must be returned on demand to, the General Accounting Office.

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Statement of Facts

In response to a March 7, 1990, request we reviewed the status of the Department of Energy's (DOE) Superconducting Super Collider (SSC). The SSC will be the world's largest high energy particle accelerator and will be located 30 miles south of Dallas, Texas. Originally estimated to cost $4.4 billion (in fiscal year 1988 dollars), DOE recently estimated the cost of the SSC to be $8.2 billion (in current year dollars). The letter expressed concern that once beyond the design phase, other problems could lead to further cost increases. As requested and as subsequently agreed, we reviewed the status of DOE and the SSC Laboratory project management, SSC construction, magnet development and production, and Texas' proposed $1 billion contribution.

RESULTS IN BRIEF

DOE and the SSC Laboratory have taken limited actions to reduce the risks and uncertainties associated with the SSC.

-- DOE and SSC Laboratory management has been unstable with acting directors in key positions. In general, unstable management tends to adversely affect long-term planning and decision-making and to reduce the clout or effectiveness of acting officials.

-- The SSC will be built through a geological formation that has many risks and uncertainties associated with it because of its high potential to expand and contract. To better understand the geology, the SSC Laboratory plans to construct a section of the SSC tunnel.

-- Full-size superconducting collider dipole magnets of the current design have not yet been built or tested. Because the design of the magnet was changed, the tooling has not yet been

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available for producing the magnets. In addition, the development schedule for the collider dipole magnets is compressed and as such, increases the risk for the magnets because little time will be available to resolve any problems that may be encountered. To reduce the risks and uncertainties, DOE's High Energy Physics Advisory Panel (HEPAP)[1], recommended that the front end of the schedule be lengthened. As a result, the SSC Laboratory has added 5 months to the development schedule. A critical point in the magnet testing is the above ground string test presently scheduled for September 1992. The successful completion of this test should give reasonable assurance that the magnets and supporting systems will operate as intended.

-- Although Texas' September 1987 proposal for siting the SSC in Texas pledged to contribute $1 billion toward the SSC, under a memorandum of understanding with DOE, Texas has only agreed to contribute up to about $700 million for construction. While the precise use of the funds has yet to be determined, portions of that $700 million are tentatively planned for activities indirectly related to the SSC construction. The remaining $300 million was pledged toward reducing the cost of electricity and for SSC related research and development.

BACKGROUND

When completed, the SSC will accelerate two beams of protons to nearly the speed of light before they collide with an energy of 40 trillion electron volts (TeV). Physicists will then analyze the collisions to detect the presence of new subatomic particles and measure their properties. The SSC facility will consist of (1) a

[1] In 1967 DOE established the High Energy Physics Advisory Panel to review DOE's high energy physics program and provide advice on overall program balance, scientific priorities and special problems.

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series of four injector accelerators to accelerate the proton beams from rest to 2 TeV, (2) an oval tunnel 54 miles in circumference (see appendix I) and at least 35 feet underground in which the injected beams are accelerated in opposite directions to nearly the speed of light, (3) 4 underground interaction halls in which experiments will be conducted by colliding the beams, (4) conventional buildings, such as a central laboratory building, industrial buildings, warehouses and auxiliary support buildings, and (5) roads and utilities infrastructure. The SSC's principal technical components are the 8,600 superconducting collider dipole magnets that will bend the proton beams around the tunnel. These magnets have recently been redesigned. The superconducting magnets are to be produced by private industry--a task that has never been done before on such a large scale.[2]

In April 1987, DOE issued an invitation for site proposals, inviting states and others to provide land to the U.S. government on which to build and operate the SSC. In January 1989 selected the site for the SSC in Ellis County, Texas, about an hour's drive south of Dallas. At the same time, DOE established the SSC Laboratory in Dallas, Texas, and selected Universities Research Association[3] as the management and operations contractor.

In January 1989, DOE also established, within its Office of Energy Research, the Office of the SSC. The Office is responsible for, among other things, formulating SSC policy, negotiating with foreign governments to establish collaborative arrangements, and overseeing safety, environmental, managerial and financial matters.

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[2] Superconducting magnets used in Fermilab's Tevatron were produced at the laboratory. Germany's Deutsches Elektronen Synchrotron Laboratory uses about 400 industrially produced superconducting dipole magnets in its accelerator, called HERA.

[3] Universities Research Association is a consortium of 66 universities and has been DOE's contractor for the SSC national R&D program since 1984.

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Within the Office of the SSC is the On-site SSC Project Office located in Dallas, Texas. The Project Office, established in April 1989, performs on-site technical, financial, and construction monitoring activities and serves as the focal point for day-to-day management issues and activities with the contractor-operated SSC Laboratory.

In December 1989, the SSC Laboratory made several major design changes to increase the chances that the SSC will work. These changes increased the energy of the 1 TeV injector to 2 TeV, the circumference of the collider ring from 52 miles to 54 miles, and the aperture[4] size of collider dipole magnets from 40 millimeters to 50 millimeters. (See appendix II for a diagram of the collider dipole magnet.) The changes were made as a result of new information from operation of the accelerator at DOE's Fermi National Laboratory (Fermilab) in Batavia, Illinois, and from magnet development for an accelerator built in Germany. In January 1990, a HEPAP subpanel[5] reviewed the design changes and concurred with them in light of the new information.

DOE AND SSC LABORATORY MANAGEMENT HAVE BEEN UNSTABLE

Key positions in DOE's Office of the SSC and the SSC Laboratory have been filled by acting directors, and these acting directors frequently changed. DOE has not yet been able to name a permanent program manager for the SSC, but the SSC Laboratory recently appointed permanent directors to key positions.

In the absence of a permanent program manager to direct the Office of the SSC, this office has not had stable leadership since it was

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[4] The inner diameter of the magnet coil.

[5] "Report on the 1990 HEPAP Subpanel on SSC Physics," DOE/ER-0434, January 1990.

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created in January 1989. For the first 4 months, the office had no director or acting director. In May 1989, an acting director was detailed from DOE's Basic Energy Sciences Office and was in the position for 15 months. The current acting director, who is also the deputy associate director for the Office of the SSC, was named in July 1990. A DOE official told us that the position has not been filled because DOE has not been able to recruit a person with the unusual set of skills needed for this position in part because of the relatively low salary and post employment conflict of interest restrictions. The official said that DOE plans to fill the position soon, but was uncertain as to the date.

In November 1990, the DOE Inspector General reported that headquarters had key vacancies--the most prominent being a permanent program manager.[6] The Inspector General commented that the staff vacancies contributed to delays in resolving certain critical issues and to a general lack of program direction. In response, DOE management pointed out the increased staffing during fiscal years 1990 and 1991 and attributed the delays to technical changes.

Although problems attributable to the unstable leadership are not easily quantified, our past work has shown adverse effects on long-term planning and decision-making and reduced clout or effectiveness of acting officials.[7]

DOE did not name a project manager for its on-site Project Office until May 1990. The project manager told us that before his appointment, communication between the SSC Laboratory and DOE had

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[6] Special Report on the Department of Energy's Superconducting Super Collider Program, Office of Inspector General, DOE, November 16, 1990.

[7] Social Security Administration: Stable Leadership and Better Management Needed to Improve Effectiveness, March 18, 1987, GAO/HRD-87-39.

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been scattered because they lacked a focus point for communication. He believed he could become the focus point. For example, the SSC Laboratory and DOE had been discussing a draft request for proposal for superconducting magnets for about a year. Upon his appointment, the project manager was able to get the SSC Laboratory and DOE management to agree on the draft magnet request for proposal within 2 weeks.

The SSC Laboratory management has also been unstable. Although the SSC Laboratory was established in January 1989, it operated with acting managers in three out of six key positions until October 1990. In this regard, in July 1990 the HEPAP subpanel reported that a matter that needed close watching was the establishment of stable management at the SSC Laboratory.[8] The subpanel stated that managers must be able to work together effectively as a team dedicated to the single objective of creating a working SSC and that this comes about only when all the managers have had enough time to develop respect for each other.

In October 1990, the SSC Laboratory revised its organizational structure because, according to laboratory officials, the SSC moved from a design to a construction phase. The most significant change was naming a general manager, a former vice president for a large architect/engineering firm, with experience managing large construction projects. At the same time, the SSC Laboratory also appointed several other permanent managers; it shuffled managers for some divisions and hired new managers for others.

SITE GEOLOGY ADDS COMPLEXITY TO CONSTRUCTION

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[8] "Report of the 1990 HEPAP Subpanel on SSC Cost Estimate Oversight," July 1990.

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In March 1990 DOE approved the site specific footprint[9], allowing Texas to begin acquiring land for the SSC. As originally proposed by Texas, the tunnel would have been excavated through two geologic formations--70 percent Austin chalk and 30 percent Taylor marl.[10] However, with the changes to the footprint from the conceptual design, the site specific footprint now includes three geologic formations through which the collider tunnel will be excavated: approximately 29 miles of Austin chalk (about 54 percent), 18 miles of Taylor marl (about 33 percent), and 7 miles of Eagle Ford shale (about 12 percent).

Although the Eagle Ford shale formation makes up only 12 percent of the collider ring, risks and uncertainties are associated with construction through the formation because of its high shrink-swell potential. The SSC Laboratory proposed digging a large diameter drill hole to obtain data on the nature of the shale. The drill hole, however, was canceled because of its cost. As an alternative, the SSC Laboratory proposed to obtain the information through construction of a prototype installation facility.[11] In August 1990, the facility was eliminated as a separate project and instead a section of the SSC tunnel will be built to obtain the data on the shale.

The bottom of one of the interaction halls that will house a large detector[12] will be constructed in the Eagle Ford shale formation.

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[9]Footprint refers to the shape and location of the land that the laboratory and accelerator will occupy.

[10]Marl is a gray claystone, a soft rock.

[11]The prototype installation facility was a separate underground tunnel for studying the below ground installation of magnets and cryogenics (refrigeration systems).

[12]A detector registers the matter and energy of particles produced by the collision of protons. A large detector is estimated to weigh from 20,000 to 60,000 tons.

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According to SSC Laboratory officials, the shale will swell when the overburden of earth is removed and settle when pressure is reapplied from the weight of the up to 50,000 ton detectors. To better understand the reaction of the shale, in December 1989, the SSC Laboratory proposed to dig a large diameter drill hole at the site of one of the interaction halls. The SSC Laboratory's Underground Technology Advisory Panel[13] stated that information on ground behavior in the Eagle Ford shale needed to be obtained at the earliest possible date for inclusion in preliminary and final design and advised that the drill hole be built in advance of other construction. However, in June 1990, the drill hole was canceled as too costly--$3 million to $5 million.

Instead, the Laboratory planned to obtain the information through construction of a prototype installation facility. The advisory panel stated that field measurements at the prototype installation facility could be pursued in lieu of the drill hole, provided that the start of the facility was not delayed. According to DOE's project manager, in August 1990, the prototype installation facility was eliminated and the decision was made to build an actual section of the SSC tunnel instead. This would enable the SSC Laboratory to resolve the uncertainties in the geology sooner. The SSC tunnel section is proposed to be started in October 1991, which is before the September 1992 start date that was projected for the prototype installation facility. The section will be dug through the Eagle Ford shale formation and will be instrumented for the shale's expansion and movement characteristics.

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[13]The Underground Technology Advisory Panel was convened at the request of the SSC Laboratory to review various aspects of conventional construction. The panel consists of geology and geotechnical consultants.

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COLLIDER DIPOLE MAGNETS REMAIN A SIGNIFICANT RISK

Full-size 50-millimeter collider dipole magnets have not yet been built or tested. Because of the change in design from a 40-millimeter to a 50-millimeter aperture, the tooling has not yet been available for producing these magnets. Although testing continues on the 40-millimeter magnet, much of the needed data will not be available until the 50-millimeter magnets are built and tested. In addition, the magnet development schedule is compressed with many overlapping tasks. The above ground string test scheduled for September 1992 is a critical milestone for determining whether the magnets and supporting systems will work together.

Collider dipole magnets are untested

With the change in design, the full-size 50-millimeter collider dipole magnets have not yet been built or tested. The SSC Laboratory's approach to developing the superconducting magnets involves the building and testing of both model[14] (1 meter in length) and full-size (15 meters in length) magnets. The approach calls for the subsequent proven design to be detailed in a series of specific process and performance specifications for use by industry.

DOE's Fermilab has the lead responsibility for doing the collider dipole magnet research and development. To date Fermilab has not built a complete 50-millimeter full-size magnet because it is still procuring the tooling for these larger aperture magnets. In October 1990 Fermilab received the tooling for the model 50-millimeter magnets and started building the first model magnet.

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[14]Model magnets are used to test tooling and magnet design features before they are incorporated into a full-size magnet.

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Fermilab completed and began testing it in December 1990. Fermilab officials told us that they expect to receive the tooling for the full-size magnets by April 21, 1991, at which time they will start building the full-size magnets.

In the absence of the 50-millimeter magnets, Fermilab is continuing to build and test magnets of the original 40 millimeter design. The 40-millimeter magnets are being built to test various components, such as insulation and the superconducting wire. However, according to Fermilab officials, the 40-millimeter magnet program was reduced for fiscal year 1990 because of the design change to the 50-millimeter magnet and a lack of superconducting wire. The officials stated that because of budget limitations, a minimal amount of superconducting wire was bought for 1990. Therefore, two out of six proposed full-size 40-millimeter magnets were not built. According to an SSC Laboratory official, the effect of not building all the proposed 40-millimeter magnets is that they do not have as much information as they otherwise would have had. However, he believed the impact on the program will be minimal because development that would have been done on the 40-millimeter magnets will now be done on the 50-millimeter magnets.

Collider dipole magnet development schedule compressed

The magnet development schedule is compressed with overlapping development stages and provides little margin for resolving problems. The HEPAP subpanel stated that the schedule is "extremely optimistic" and recommended adding 6 to 12 months to the early part of the present schedule to, among other things, reduce risk in the magnets. In response to the HEPAP recommendation, the SSC Laboratory added 5 months to the time for industry delivery of the first production magnets.

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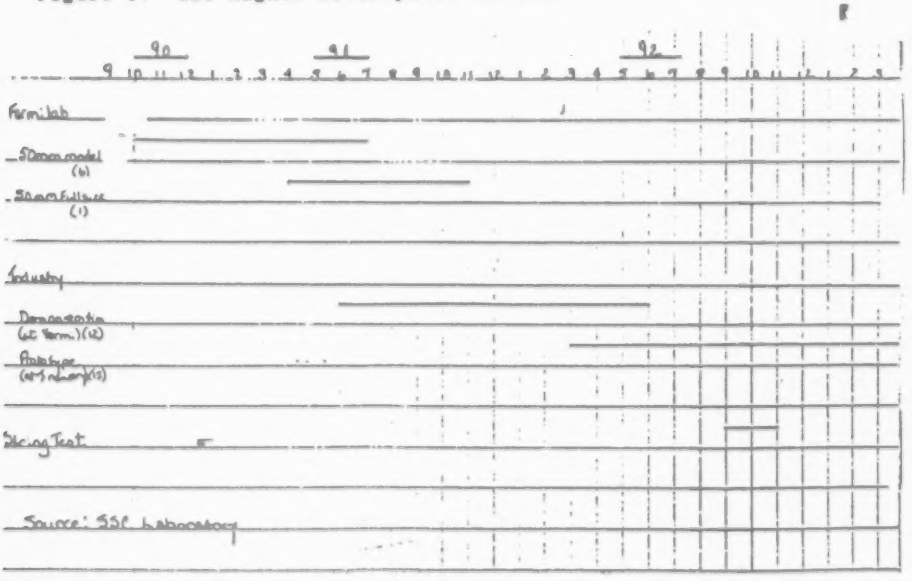
In July 1990, the SSC Laboratory issued a request for proposal for collider dipole magnets, and in October 1990 announced that General Dynamics and Westinghouse had been selected to enter into negotiations for the contract. Thus, the SSC Laboratory went out for bids even before Fermilab began building the first model 50-millimeter magnet in October 1990.

Further, according to an SSC Laboratory official, when problems arise in one development stage they will be resolved in the next stage. However, as shown in figure 1, Fermilab's magnet development activities overlap both its and industry's scheduled activities.

Figure 1: SSC Magnet Development Schedule



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The figure shows that each subsequent phase of development overlaps the preceding phase. For example, before Fermilab completes building and testing its first full-size 50-millimeter dipole magnet, industry is scheduled to fabricate the first full-size demonstration magnet at Fermilab from June 1991 to October 1991. Therefore, industry is scheduled to complete building its first full-size magnet before Fermilab is scheduled to complete testing of its first full-size magnet in November 1991.

The first five demonstration magnets will be tested in the above ground string test.[15] The next step is to produce prototype magnets with industry tooling. According to an SSC Laboratory official, the schedule for industry assembly of prototype magnets is not yet established, but industry will start assembly of prototype magnets prior to the completion of the September 1992 above ground string test. As a result, funds will be spent to produce prototype magnets before the results of the string test are known.

According to SSC Laboratory officials, the September 1992 above ground string test is critical in determining whether the 50-millimeter dipole magnets will work together and with the other SSC components, including the electrical power supply and cryogenic systems.

TEXAS CONTRIBUTION TOWARD SSC CONSTRUCTION COST LESS THAN $1 BILLION

Although Texas, in its September 1987 site proposal, pledged $1 billion toward the SSC, only up to $700 million of this amount was pledged toward the cost of SSC construction. Of the remaining $300 million, $175 million was pledged toward reducing the cost of

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[15] A string test integrates the magnets with the technical support systems.

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electricity, $100 million was for SSC-related research and development, and $25 million was unallocated.

In November 1990, DOE signed a memorandum of understanding with Texas, stating that the September 1987 proposal serves as the basis for the Texas contribution. The memorandum of understanding makes no other statement as to what the funds will be used for other than that they will be dedicated to reducing the overall cost of the SSC program to the federal government.

According to the Texas National Research Laboratory Commission[16], the $700 million would be for upgrading the existing infrastructure, such as roads and utilities, as well as for constructing SSC facilities. Other uses, according to Texas' May 1990 issuance of general obligation bonds for the SSC project, "... include funding for comprehensive land-use planning to integrate the Lab into the region, the expansion of research and academic support for the national Superconducting Super Collider program through post-doctoral fellowships and the award of related research and development grants, the construction of conventional facilities on the Lab campus, magnet testing and development, and continued testing and exploration of the geotechnical characteristics of the site."

According to the Commission's cost projection, about $239.2 million has been budgeted to the SSC for the Texas contribution for fiscal year 1991[17]. Of the $239.2 million, about $126.5 or 52 percent is budgeted for construction activities. Other items budgeted for include, among other things, $75.9 million for land purchase, $15.4 million for research and development, and $16 million for infrastructure other than the SSC construction.

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[16]The Commission represents Texas in the development, financing, construction, and operation of the SSC.

[17]A Texas fiscal year is from September 1 to August 31.

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Mr. WOLPE. "On Friday, February 8, 1991, a GAO Exit Conference was held in my office regarding the GAO Draft Report on Statement of Facts—Status of SSC. Attachment 1 is a summary of the GAO report based on discussion in the meeting describing the statement of fact and Department position. The GAO report is provided as Attachment 2." End of quotes.

You familiar with that memorandum, are you not?

Mr. GIBBS. I would, I—yes.

Mr. WOLPE. Did the Secretary realize that you did meet with the GAO prior to publication of its report and in fact offered suggestions on rewording and that those suggestions were in fact incorporated in—some of those suggestions were incorporated into the final document?

Mr. GIBBS. I believe he was aware, certainly the Director of Energy Research, and on up the chain would be aware that discussion had occurred.

I think again what he was referring to, and what he's concerned about is what is viewed as not a reasonable presentation of the facts and——

Mr. WOLPE. Well, I'm just only trying to react to this one comment that—in the Secretary's letter which says, "The GAO—it was released by the GAO with no opportunity for the Department to comment on the information presented or the veracity of the conclusions."

Mr. GIBBS. In the—in its final form that is the case. We have not—we did not see that report—well, before it was published.

Mr. WOLPE. You had an opportunity, did you not, to comment on information presented, is that not what your own memorandum reflected that you sent out?

Mr. GIBBS. Yes, we commented on the information that was presented as we saw it at that time.

Mr. WOLPE. So this statement of the Secretary's is simply incorrect. Is it not?

Mr. GIBBS. I don't believe he—in the way he intended it to mean, that we did not have an opportunity for formal comment that it is incorrect, sir.

Mr. WOLPE. Okay. Let me also say at the outset that I have no doubt that there are a number of people associated with the SSC that are working very hard, very diligently to attempt to address a number of the problems, a number of the deficiencies that have been identified in earlier years.

The problem, I fear, is that there is a very long history to overcome and there are still remaining serious questions as it relates to whether or not there has been a full identification of all costs associated with the project and as to whether there is now in place a management system that will allow the project to come in as it is projected, on cost and on time. So, that's the thrust of the kind of inquiry that I'm trying to raise here.

Let me begin on this issue of the cost projections. Mr. Gibbs, the Department sets its official cost estimates for the SSC at $8.249 billion, is that correct?

Mr. GIBBS. Yes.

Mr. WOLPE. And that was done after the SSC lab did the preliminary budget estimate which has been reviewed by three groups: the

Energy Research Review Committee, the High Energy Physics Advisory Panel and a team from DOE's Independent Cost Estimating group.

Mr. GIBBS. That's correct.

Mr. WOLPE. And the three independent reviews each came in with recommendations higher than the lab's estimate, indeed higher than the Department's official estimate.

Mr. GIBBS. Yes.

Mr. WOLPE. Now the Department's official figure of $8.249 billion lacks money identified as foreign contingency costs. Is that not right?

Mr. GIBBS. There was an adjustment in the results in the $8.249 billion number that accounts for in-kind contributions of foreign—foreign in-kind contributions. That adjustment is $219 million.

Mr. WOLPE. So you are assuming you're going to get large foreign contributions. What is the current total of legally binding commitments to this project?

Mr. GIBBS. At this very moment the existing legal commitment is one of an agreement between the U.S. Government and India on, under a Science and Technology Initiative and that's for $50 million over the life of the project.

Mr. WOLPE. Are you characterizing that as a legally binding commitment from the——

Mr. GIBBS. Well, it's an agreement and—I cannot characterize for you at this moment exactly——

Mr. WOLPE. Can you characterize it at least as an ironclad agreement, as far as you're concerned?

Mr. GIBBS. It's the commitment that we have on their part and it's a signed agreement and——

Mr. WOLPE. A signed agreement?

Mr. GIBBS. Yes.

Mr. WOLPE. Okay. Is there any other commitment?

Mr. GIBBS. There are no other signed agreements for other, other commitments——

Mr. WOLPE. Okay.

Mr. GIBBS [continuing]. At the government-to-government level.

Mr. WOLPE. Let me just ask a couple remaining quick questions——

Mr. GIBBS. Yes.

Mr. WOLPE [continuing]. Because they—I just heard the bell. Why, we have a timer that now has a bell associated with it. [Laughter.]

Mr. WOLPE. Removing the money for foreign contingency does hinge upon the assumption that foreign contributions will be in-kind and not in cash, is that correct, at least largely in-kind, not cash?

Mr. GIBBS. What it attempts to account for is the likelihood that large contributions of the magnitude that we are looking for, to obtain the goal of one-third, the $1.7 billion, will be largely in in-kind contributions and not in cash.

Mr. WOLPE. In testimony before Senator Ford's subcommittee on April 16th, Deputy Secretary Moore indicated that it was his strong feeling that much of the needed foreign contributions will

come late in the project, perhaps even after it is completed in the form of cash contributions. Isn't that correct?

Mr. GIBBS. I believe that's a correct statement of his testimony.

Mr. WOLPE. And he had said this before, in fact, he said it at the ceremony marking the signing of the MOU with Texas last October. If he was saying this last October, that is at the same time that the cost and schedule baseline report was being discussed within the Department. It isn't a new position, is it?

Mr. GIBBS. No, I think we have identified and are in the process of pursuing a variety of areas of participation with different countries, certainly the combination of what is possible to be contributed as well as the technical needs of the project, would meet the one-third goal.

What I believe the Deputy Secretary has reflected is a judgment on the timing of when we might see that occur. It's probably, in all probability, later than sooner and that's why it's important——

Mr. CIPRIANO. I—may I help with this? I think there's contributions that we would get or that would be useful that would be in-kind—would have to come earlier in the program than cash contributions. Contributions of cash, if we received them, would be, more likely be—what we could wait, what we could accept at the very end of the program. I think it's what the Deputy Secretary said. And if they are at the very end of the program, they would be spent on things where there is not a lot of risk involved on labor operating costs and things of that nature since the major procurements would have already been placed.

Mr. WOLPE. With all respect, you can't have it both ways. If the expectation is that most of the contributions are going to come in cash, meaning that we would in fact be building the equipment, then it follows that we have to have a larger contingency item. If in fact, most of the contributions are going to be in-kind contributions, then you can legitimately talk about a lower foreign contingency element. But you can't have it both ways.

Mr. CIPRIANO. I understand our foreign expectation is that most of them will be in-kind. I think that's what's reflected——

Mr. WOLPE. But that's in direct conflict then with Mr. Moore's repeated testimony at the same time you were making this case that it was going to—which is it? Who's—what's the policy? What's the position?

Mr. GIBBS. The policy is as outlined in the baseline cost reports that we have submitted. It was approved by Secretary, Deputy Secretary Moore and, as well as signed out by the Admiral.

Mr. WOLPE. Then Mr. Moore wasn't telling the truth or what? I mean, I don't understand.

Mr. GIBBS. I can't say that at——

Mr. WOLPE. Well, my time has obviously elapsed. Mr. Boehlert.

Mr. BOEHLERT. Has the Department ever subtracted foreign contingency from prior cost estimates presented to Congress?

Mr. GIBBS. I don't believe so.

Mr. BOEHLERT. Well, so it would be consistent with prior estimates presented to Congress to accurately reflect the level of foreign participation formally on-board this project, and to be in agreement with DOE's own claims about when and what form of

foreign participation we'll take, we should add those monies back into the total project costs, shouldn't we?

Mr. GIBBS. Well, what we are, I believe, attempting to show with the baseline report and the contributions that are outlined there in terms of foreign contributions, is what is the net dollar value in terms of U.S. funds.

And in that context, if you look at getting large in-kind contributions, you—they will in all likelihood be part of a formal government-to-government commitment with formal agreements and once they do have a formal agreement for an in-kind contribution, the contingency resides with the country that's committing to make that contribution and we think that—thought therefore, as outlined in the report, that is not the necessary element of the cost because it does not impact the U.S. dollars.

Mr. BOEHLERT. I find an awful lot of inconsistencies here Mr. Gibbs, I'll tell you that.

I'd like to discuss the Independent Cost Estimating team's recommendation on the total project cost. Now, ICE is a review that came in with the highest number of all the review teams. That was $11.8 billion. Is that correct?

Mr. GIBBS. Yes, sir.

Mr. BOEHLERT. Deputy Secretary Moore has described the other review groups, HEPAP and the ERC, as piggybacking off the lab's original $7.8 billion estimate. HEPAP and ERC spent a few days at the lab and a few weeks writing their reports. Is that how ICE worked, a few days, and a few weeks?

Mr. GIBBS. I, I don't know, I believe the ICE group—and we have Mr. Scarlett here to comment on this—but I believe they participated in the review in the same way that the Energy Review Committee and the HEPAP——

Mr. BOEHLERT. Well, they spent more than a year working on it, didn't they?

Mr. GIBBS. I believe so, yes. I mean in addition to the reviews, there was additional work up front by the ICE team, to my knowledge.

Mr. BOEHLERT. So, you've got a group that's spent more than a year on-site, working the report, really in-depth analysis and they come up with $11.8 billion figure. And you've two other groups that spent a couple of days and they come up with a much lower figure. Isn't it true that the man who headed up the team, that team, became so expert at SSC costs and supply issues that he was hired away from ICE to join the office of the SSC?

Mr. GIBBS. No, that is not exactly the way it occurred.

Mr. BOEHLERT. Well, tell me how it occurred.

Mr. GIBBS. You're referring to Mr. Konopnicki and he is presently employed by the Office of SSC. He was one of several applicants for an advertised position that was advertised and closed all during this process and he was the best, the best applicant, and was——

Mr. BOEHLERT. Very, very talented man, obviously, to be selected for that very demanding position.

Mr. GIBBS. He's a good man, yes.

Mr. BOEHLERT. Yes, and he's the man that, that headed up the team that did the ICE report that come in with a figure of $11.8 billion. Is that correct?

Mr. GIBBS. But, he was not selected as a result of his expertise in the SSC or the ICE activity.

Mr. BOEHLERT. Oh, that's interesting. You have so much confidence in his skill that he's been working to develop a detailed planning schedule and budget baseline for SSC, is that true?

Mr. GIBBS. He's been working with the project office on-site to do that.

Mr. BOEHLERT. With that background, excuse me, with that background, didn't ICE recommend that you include the cost of operational spares on-hand to support post commissioning operations? They suggested you include $110 million as I understand it. Did DOE put any money in the budget for such operational spares?

Mr. GIBBS. Yes, let me have Mr. Cipriano address that but there are monies and he will comment on what they are in the total project costs for operational spares for those operations associated with commissioning of the——

Mr. BOEHLERT [continuing]. Of proposed commissioning spares, now we're talking about $110 million?

Mr. GIBBS. Yes, well, secondly we did not agree with the $110 million estimate and——

Mr. BOEHLERT. What figure would you use?

Mr. GIBBS. Something much lower than that and it would be based on a different——

Mr. BOEHLERT. Well, we've learned from experience that when you're estimating costs, you always estimate low. Do we have a figure?

Mr. CIPRIANO. I think it's about $40 million is what we're estimating for the cost of operating spares.

Mr. BOEHLERT. Is that in, in the report?

Mr. CIPRIANO. It is, it is included in, in our, well the report addresses the total project costs which is up to the year 2000. That was the number I quoted as an estimate. We have today—and I should qualify it, because we haven't done the complete sparing model and calculated all the details yet, but you can't do that until you have a design complete, but with that as an estimate, the ICE number I believe was just a flat percentage of total costs of everything for spares.

Mr. BOEHLERT. Well, could you show us where it is in the budget? I mean, whether it's $110 million or $40 million, could you show us where it appears?

Mr. CIPRIANO. It's in, okay there's—in the total project costs which what we're describing which covers costs up to the point of commissioning of the machine, it's included in WBS four and five. If you look at——

Mr. BOEHLERT. Excuse me, let me stress, we've looked at it, we can't find it. Maybe you can help us. I hate to be nitpicking but $40 or $50 million here or there, you know, it adds up to real money after awhile.

Mr. CIPRIANO. Post-commissioning costs, spares costs, are not included in the TPC, they're included in WBS six and we can show you where they are included in that, which is beyond——

Mr. BOEHLERT. Show us where they are, show us where they are, please.

Mr. CIPRIANO. Which is beyond——

Mr. BOEHLERT. Which is WBS six?

Mr. CIPRIANO. TPC, yes.

Mr. WOLPE. Looking at it, if I could, to the gentleman, do you——

Mr. CIPRIANO. It's on there, WBS six.

Mr. WOLPE. The WBS six is not included——

Mr. CIPRIANO. That's correct.

Mr. WOLPE [continuing]. In the total project cost number?

Mr. CIPRIANO. It's not included in the total project costs. What is included in the total project costs, is cost of construction and operations up to the point of commissioning the different phases of the machine.

Mr. WOLPE. So the $110 million that was recommended does not, would not even appear as a project cost figure from your point of view. And yet you could not do the project without incurring those costs. Is that not correct?

Mr. CIPRIANO. Yes, we can construct the machine and commission it without that cost. We cannot operate it after commissioning without——

[Laughter.]

Mr. WOLPE. You can't operate it without—oh, so you would be, you would be constructing a totally useless instrument without that cost. Is that a more accurate statement?

Mr. CIPRIANO. It would be a useful instrument that would require operating costs to support it, just like any other instrument after it was constructed.

Mr. BOEHLERT. Well, I think, Mr. Cipriano, you can understand why we have some questions about this.

Mr. CIPRIANO. Yes.

Mr. BOEHLERT. And I think you would concede that they are very legitimate questions.

Mr. CIPRIANO. Yes. And these costs are budgeted as part of High Energy Physics operating costs, the HEP lines is where the Department has chosen to budget operating costs for SSC, after its commission.

Mr. BOEHLERT. It's almost like—if I could draw an analogy—like buying an automobile and, and, but not filling it up with gas and, you know, you can't do it that way. You can't operate your automobile unless you have the gasoline to operate the automobile.

Mr. CIPRIANO. Yes, sir, but when you buy an automobile from the Ford dealer, he doesn't continue to fill up your tank with gas after you drive if off the lot.

Mr. BOEHLERT. No, no, I understand that.

Mr. CIPRIANO. It's a separate cost and——

Mr. BOEHLERT. But I, I just had the experience because I'm trying to spur the economy and I've just had the experience of buying a new automobile and I can guarantee you when I picked it up, it didn't have an empty gas tank. So you got to be realistic in dealing with these issues.

Now, what's the specific reference in WBS six, can you give it to us please so we can track this down, this errant $40 million that we think is insufficient, it should be $110, but we won't quibble over the missing $70 million.

Mr. CIPRIANO. We'll provide it for the record.

[The information follows:]

Operating spares costs are specifically in WBS 6.3.1.10—Replacement Components—with a cost estimate of $40.8 million. In addition, $20 million is included in WBS 4.1 for pre-commissioning spares.

Mr. BOEHLERT. Okay, fine, thank you. I notice the bell has rung.

Mr. WOLPE. Thank you very much, Mr. Boehlert.

Mr. GEREN. Thank you, Mr. Chairman. Thank you all for your testimony. Much of the GAO report focused on the difference of the testing of the magnets between what you're doing and what the Germans did. It seems much of their concern is derived from the fact that you're just doing it differently. Would you comment on why you are doing it differently and if that is reason for concern? I guess one other question I might have is how long ago was that German project, the testing of the magnets in that German project?

Mr. BUSH. I think the German magnets have been delivered in the last year or two and have been just completed testing and they have just started, or completed installing them on the ring. So, the timing is like now. In fact when the fellow that ran some of their contracts participated with me in the selection of some of our contracts—a fellow from HERA that actually ran their contracts.

The testing difference is essentially there is not any testing difference. Every magnet that I buy will be tested, every magnet that I buy will be tested such that we're satisfied it can operate in the ring or we won't take it.

The issue has come up, I think, and been covered a little bit by, where do you test them, where do you finish up the cold part of the test? And that's an economic argument. If you do it above ground, in the case of the over 12,000 total superconducting magnets, we'll have 11,000 total superconducting magnets—we'll have, you have to put an enormous of facilities above ground which really duplicate things you're going to have in the tunnel and available anyway. So what we chose to do, is to do sort of a two step early in the program with a modest set of capability. Essentially we will test every magnet that's received, of course not only warm but also cold, above ground. We'll also test them below ground, warm and cold.

Later on, as the production rate gets heavier and as we reach a confidence level that the concern we have with magnets being a problem once they're in the tunnel and tested down there, then we will reduce the amount of magnets we test above ground. In particular—in HERA's particular case, since they had around 400 magnets, the number of test stands they needed and the schedule that they had, allowed them to test them all above ground before they put them in their tunnel. So essentially the difference is, one of economic scale. If we wanted to build all the facilities above ground, duplicate everything we're putting in the ground, it's on the order of about $200 to $300 million more money we would need and we don't think that the failure rate of magnets in the tunnel is going to be large enough to warrant that kind of a capital investment.

Mr. GEREN. So, the decisions that you made regarding the testing were made with full knowledge of what the Germans had done?

Mr. BUSH. Oh, you betcha. It turns out that we spent an awful lot of time over there, especially my test team, and in fact, the fellow that runs their test facility now works at the SSC and, works with me in developing our test techniques further from what we've already done over the past three or four years. So, we have, what I'd call a day-to-day communication with the HERA people on how to test magnets and what that's all about.

Mr. GEREN. So that the GAO, they were not technical people and so they could not make any independent assessment whether you were doing it—your way was better than the Germans, but they just seemed to have significant concern that you were doing it differently than the Germans and I guess what I am trying to get from you—and I believe you've answered—is that you've considered what the Germans did and you, your scientists and engineers concluded that the way you're doing it makes more sense for this project than the way the Germans did it.

Mr. BUSH. Yes, that's correct. It turns out that my staff has been testing, all of the magnets that have been produced to date, all of the long magnets. My SSC staff does that and does the analysis of the data. So, we were the ones that had the conversations and the discussions directly with the HERA people. We're the ones that hired HERA's, many of HERA's engineers and test people to come and help us when we get ready to do our own testing when the facility is built.

Mr. GEREN. So, the fact that our project—we're doing it differently and the Germans—it's no reason to, to cause us as a committee any concern.

Mr. BUSH. The only difference is we chose not to, if you will, in my opinion, waste $300 million building facilities that we were going to build someplace else.

Mr. GEREN. Well, thank you. Could you also—jump to another subject, I don't know who best to address this to, but maybe Mr. Gibbs, could you discuss the ICE estimate and compare it to DOE's $8.2 billion, just to make sure as a committee we do understand the differences between those two numbers, and certainly it's one that many questions have been raised about.

Mr. GIBBS. Okay, the, the baseline cost report lays out a comparison—and on the page of that comparison is, I'll find it in a moment—but, it compares the cost, the base cost of construction for the various elements and what the ICE estimate—I guess the first point of reference was done relative to the proposal by the laboratories, to the $7.8 billion number, which had completion in fiscal year 1998.

The ICE estimate was concerned about various elements of cost. We worked back and forth in terms of reconciling some of those concerns and went back—had the laboratory go back and validate their vendor quotes where they had them, engineering estimates, and other places where they had them and several adjustments were made.

In addition to adjustments in the individual cost elements, there was an addition to the schedule which ended up extending the schedule by one year from what had been proposed by the laboratory. But it significantly changed the funding profile that went with all of the reviews, really. The comparisons in base costs—if you

look across the reviews and look at base costs and the baseline that we had, the Department has put forward, we agree within basically three and half percent, even with the highest, which was the ICE estimate, in terms of base cost.

Then when you add in the contingency—which was one of the areas that they felt in their judgement, there were significant differences—and they had a higher estimate of what technical risk was or might be, as well as what schedule risks could be. They added in another several hundreds of millions of dollars in both of those, in the contingency area.

When you then escalate that contingency—it's a higher in the first place— and the base cost, you account for the differences between the construction estimate and the DOE baseline. I've got a figure here that, when you're looking through this in the cost baseline, that our cost estimate for construction is $6.35 billion and the corresponding cost comparison that the ICE team came up with is $7.17 and the difference there being basically the contingency differences and estimates of technical and schedule risks, not any differences in terms of the estimate of what the actual cost per unit, if you like, would be. And so, it's that judgement and differences, the primary difference in terms of the cost of construction.

There's another element to the total project cost and that is the operating costs and there were some differences there with the—that the ICE had, which were higher again from a technical and schedule risk. That's where the total project cost difference of our $8.249 billion in contrast to the $9.3.

And the last point I'll just make is that the, there were several items below the line that we—that were not viewed, were not proposed by the laboratory and were not reviewed by the other reviews that ICE—there were areas that ICE thought maybe some of these other costs should be included, and the spares is one example that we've already discussed.

Mr. GEREN. I guess my time is up. Thank you, Mr. Chairman and thank you, Mr. Gibbs and all of you for your testimony. Thank you very much.

Mr. WOLPE. Thank you very much. As I indicated at the outset of this, it's customary for all members of the subcommittee to conclude, complete their questions before yielding to other members of the full committee, but there'll be a lot of questions, so I'd like to give our Texas colleagues at least one early round of questioning here.

Mr. BOEHLERT. Mr. Chairman, if I may interject just, just one point.

Mr. WOLPE. Okay, that would be fine.

Mr. BARTON. I'd be happy to yield to Mr. Boehlert, as long as it doesn't take away from my own time.

Mr. WOLPE. It will not take away from your own time, no.

Mr. BOEHLERT. I'm just concerned, Mr. Gibbs, about the spares question. Whether we're talking about $40 million or $110 million. I'm concerned because, isn't it true that last week you gave my staff a different answer to this question? Didn't you in fact say to my staff last week that spares would come out of the contingency fund?

Mr. GIBBS. I said last week—as I recall the discussion that we had—that we were looking at the spares model. We had a spares modeling activity underway to look at what exactly we needed, that the rule of thumb that was used by the ICE team, we did not agree with. It was a high number, it was—it ended up at $110 million in costs estimated. We did not believe our needs for spare magnets were anything like that and that we felt we could get some magnets possibly through refurbishment and otherwise out of the development program that was underway, as well as on the order of $20 or $30 million within that total of $40, could conceivably come out of contingency as we moved down, down toward the end of the project. You don't need these operational spares until you're operational in the year 2000.

Mr. BOEHLERT. I have some serious questions about that because it wasn't one staff member, it was several staff members and I'm challenging that answer right here and now. I just want you to know that. I'm worried, I'm worried very much about this overall hearing and the direction in which we're going and I'd like to remind everyone, we're under oath.

Mr. GIBBS. Sir, I believe that is an accurate reflection of what I said.

Mr. BOEHLERT. Thank you, Mr. Chairman.

Mr. BARTON. Thank you, Mr. Chairman. And I'll say I'm willing to stand up and swear if you need me to.

Mr. WOLPE. We've been swearing a lot lately. [Laughter.]

Mr. BARTON. I think we all ought to be on our best behavior. Since I asked the GAO team about their background, I would like, just to be fair, to ask each member of this panel, very quickly, give me a little bit about your educational background and manufacturing or industrial experience and I would start with Mr. Gibbs.

Mr. GIBBS. Thank you. I have about 25 years, almost with the Federal Government, 20 of that has been involved in overall project experience in one form or another. I had 13 years with the Navy and the last 10 years with the Department of Energy. My technical background or early training was I have a Master's degree in Physics, I have a second Master's Degree in Systems Engineering and Systems Management, graduate of the Naval War College with "Highest Distinction" and have spent many years working on projects and managing projects, certainly not of the scope of this, but of—and not in High Energy Physics—but——

Mr. BARTON. Mr. Siskin?

Mr. SISKIN. I have an electrical engineering——

Mr. BARTON. You need to speak in the microphone, I want people to hear this.

Mr. SISKIN. I have an electrical engineering degree. I spent 14 years in Naval Reactors Program, 11 of those years reporting directly to Admiral Rickover. I subsequently joined a large engineering and construction firm. I was executive vice president and had the responsibility for the large projects that would have required——

Mr. BARTON. And what was the—what—just the general cost of those projects, the size, scale. Are we talking tens of millions or hundreds of millions.

Mr. SISKIN. Typically I had a responsibility for on the order of a magnitude of a billion dollars——

Mr. BARTON. A billion dollars?

Mr. SISKIN [continuing]. A year.

Mr. BARTON. Mr. Cipriano.

Mr. CIPRIANO. I'm a physicist by training. I have spent about 20 years in Government service and some years in industry. During all that time I was associated with one aspect or another of management or engineering of multi-billion dollar programs. The job I had right before this one, I had a number of programs that were as large or larger than this one, that I was responsible for.

Mr. BARTON. What are some of the—name some of those programs very quickly.

Mr. CIPRIANO. All of the surface ships and submarine weapons and combat systems for the Navy were under my direction as that's Executive Director of——

Mr. BARTON. And how many billions of dollars do you think that would involve?

Mr. CIPRIANO. Our budgets annually ran between $8 and $12 billion dollars.

Mr. BARTON. Between $8 billion and $12 billion annually. And Mr. Bush?

Dr. BUSH. Well, I only had paltry programs, compared to that.

Mr. BARTON. I need you to speak into the microphone.

Dr. BUSH. I didn't want that one heard. I'm sorry. [Laughter.]

I have a Ph.D. in physics and I spent the early years of my life designing nuclear weapons. Then I went into the Navy as Strategic Systems Project Officer, the Trident Program. I ran various and sundry parts of that program, including the navigation systems satellites. Budgets on the order of $1 billion to $3 billion a year.

Mr. BARTON. Budgets of $1 to $3 billion a year. Okay.

Mr. Cipriano, could you give us what your role is, who you report to and what you actually do in the, in the overall scheme of things?

Mr. CIPRIANO. I'm—my role is the Project Director for DOE. I'm on site in Texas. I have been delegated by the Department of Energy the full authority to take actions as necessary to keep this project on schedule and on cost and that is my responsibility. I report to two places: I report directly to the Secretary of Energy and have the ability to contact him and get him involved in any issues that would need his involvement; I also report through the Office of the Superconducting Super Collider into the ER chain, to make sure the project stays connected with the rest of the High Energy Physics Program.

Mr. BARTON. Do you feel like you've been encumbered in any way from doing your duty, so to speak? Have the laboratory officials tried to prevent you from knowing the facts about the costs and management of the program in any way?

Mr. CIPRIANO. Not at all, I and my staff have full access to everything that goes on at the laboratory. I've found them to be very forthright.

Mr. BARTON. Do you consider yourself the lapdog of the laboratory of the watchdog or the taxpayer in this program?

Mr. CIPRIANO. I don't think so. Mr. Siskin maybe can answer that question better but I think not at all. I consider myself the

watchdog of the taxpayer and very aggressively take that job very seriously.

Mr. BARTON. Mr. Wolpe.

Mr. BOEHLERT. I'd like to underscore aggressively on that comment.

Mr. BARTON. Congressman Wolpe, I think rightfully questioned, or expressed some concerns about the management structure in the way costs are managed. Mr. Cipriano, could you explain the work change order system that's been put in place? Elaborate on the contingency fund and how much of that contingency has yet to be released to the project?

Mr. CIPRIANO. We have, we have sensed that a great deal of effort was made establishing the cost baseline for this project by all the independent review teams. We have considered that something that we will need in all of our projections. So, we have designed a cost project with the baseline cost being the cost we're designing to.

Mr. BARTON. And that's the $8.2 billion.

Mr. CIPRIANO. It's $8.2 billion minus the contingency.

Mr. BARTON. And how much is that contingency?

Mr. CIPRIANO. Contingency is $843 million. That is completely controlled by the Department of Energy and is not considered a part of the base costs as far as the laboratory is concerned. And so they are, they are to execute the program within the base cost without contingency.

Mr. BARTON. So they're, to work on a $7.4 billion number, $7.3 billion number?

Mr. CIPRIANO. Yes, sir. If, if a cost comes up higher than a base cost estimate, then it has to go to a change control board and DOE ultimately has to approve expenditure of funds that are in excess of that base cost estimate.

Mr. BARTON. And has the laboratory attempted to get some work change orders through?

Mr. CIPRIANO. They have.

Mr. BARTON. And what has been the response of the work change committee, work order change committee?

Mr. CIPRIANO. Well, the net result is that we've actually increased the amount of money in the contingency account because we've had more areas where savings have been identified than where additional costs have been identified above the base line cost.

Mr. BARTON. Okay. I would like for Mr. Bush who heads the magnet program, to go into a little bit more detail on the testing, on the, the test results of these magnets. Have they been testing above expectation or below expectation.

Dr. BUSH. Yes. When you look at the test results on the 50-millimeters that we've done, the short ones which confirm the design decisions that my laboratory made when we did the design back in summer and winter of 1989.

Mr. BARTON. You need to speak up so everybody can hear you.

Dr. BUSH. When we did the design the summer and winter of 1989, essentially what we were looking for was a field margin of 10 percent or better. We're achieving something on the order of 15 to 17 percent of field margin——

Mr. BARTON. Is that good or bad?

Dr. BUSH [continuing]. Which is, of course, is very good.

Mr. BARTON. That's better?

Dr. BUSH. Yes. And in fact, what that allows of course is for variance during the high-rate manufacturing process to not cause problems with the magnets once they're in the tunnel.

The——

Mr. BARTON. I think my—I think the beeper has just beeped. Could I ask one more question?

Mr. WOLPE. Sure enough, surely, do.

Mr. BARTON. We'll submit for the record the test results, the GAO questions the geology of the site. I don't know who would be the best person to answer this question. Mr. Siskin is waving at me. How many geological borings have been done on-site and, and what are the results of those geological test borings that have been done? Have there been any surprises?

Mr. SISKIN. I don't have the exact numbers with me. I'll provide it for the record. It has been extensive. We've been able to characterize the site in three geological regimes: an Austin chalk, which is wonderful material to work with—that's utopia as far as an engineer is concerned.

[The information follows:]

As of June 5, 1991, a total of 155 deep borings have been completed around the project site. Of this total, 38 were completed by the Texas National Research Laboratory Commission in 1987 during the proposal stage of the project. An additional 117 borings were completed in 1989 and 1990 during the site characterization phase of the project.

Several shallow borings have also been completed by the Architect-Engineer/Construction Manager to support the design and construction of three large buildings, the Magnet Development laboratory, Magnet Test Laboratory, and Accelerator Systems String Test facility. In the near future, the Architect-Engineer/Construction Manager will initiate a deep exploration program to support the design phase of underground facilities. This effort will be phased over time to precede each discrete design contract.

The borings have produced thousands of feet of core and numerous samples for geotechnical testing. The results of this effort are contained in 86 Geotechnical Data Reports which are a matter of public record and are available through the Superconducting Super Collider Laboratory library.

The results of the borings have also been translated into a geologic cross section which undergoes further refinement with each phase of geotechnical exploration. The most current geologic cross section for the collider is available; however, its scale and detail preclude it from being presented as an attachment.

It is worth noting that continued geotechnical exploration has allowed knowledge of the site geologic cross section to be refined and, to date, has not produced information that reveals any surprises.

Mr. BARTON. Utopia is in the eyes of the beholder also.

Mr. SISKIN [continuing]. As far as a constructor is concerned. That's about 55 percent of the site, 20 percent roughly, is in a Taylor marl, which is very common. I've worked in Taylor marl on other sites in that general area. It's a little bit more expensive to work with but not very difficult and doesn't hold any surprises. Between 15 and 20 percent of the area is Eagle Ford shale, it's more complex material to work with. It can be handled, there's no question about that, but exactly how it's handled is a function of further large scale digging. That's what we'd like to do, to try to get that area instrumented.

Mr. BARTON. But in terms of discovering any large fracturing, any water table problems, any, any totally unexpected geological

formation that would cause the tunnel cost to expand tremendously—you haven't discovered any of that in your survey so far, is that correct?

Mr. SISKIN. No, we have not, in fact it's fair to characterize it as, we have found the area far better than we had any reason right to expect.

Mr. BARTON. Better than you had any right to expect?

Mr. SISKIN. Yes.

Mr. BARTON. Okay. Thank you, Mr. Chairman.

Mr. WOLPE. Thank you much, very much, Mr. Barton.

Mr. Hall.

Mr. HALL. I thank you Mr. Chairman. I guess I probably should start out by admonishing Mr. Gibbs to be sure and give Mr. Boehlert the information he requests and to be very cautious as to the accuracy of it.

In all fairness, Mr. Boehlert, who at one time had a site for the SSC in his State—we think he's not really for this project, today. [Laughter.]

And he is entitled to all the information he seeks.

Let me ask Mr. Gibbs, are you working the contracts, Mr. Gibbs, and how closely are you monitoring the contractors? I think that would be of interest to the——

Mr. GIBBS. The direct working and monitoring is Mr. Cipriano on-site, he's the head of the contracting activity at the project office.

Mr. HALL. Mr. Cipriano can give me that answer.

Mr. CIPRIANO. Yes, sir.

Mr. HALL. Just a brief summary, quickly, because I only have five minutes.

Mr. CIPRIANO. Yes, sir. We have several ways that we interface with the lab in oversight and contracting approach—the contents of the contract, and then the execution of the contract. First of all we require for any contract over $5 million that an acquisition strategy be prepared by the laboratory before the RFP is released, which describes the nature of the contract, what the objectives, and the costs that have been allocated and how those compare with baseline costs, the type of contract and those sorts of issues which we then concur with.

After that has been concurred, the laboratory may then release the request for proposals which includes technical requirements and deliverables and so forth. This is reviewed by the Department to make sure that the technical requirements are compatible with the top level design parameters for the machine.

And then have an industry response, after the laboratory evaluates the bids from the vendors, we are then briefed on what those are and agree on a negotiating position that the laboratory may then negotiate contracts to. They then do that and then the contract comes back to us for final approval.

Mr. HALL. Do you have people below your—I guess I'll use paygrade for lack of another——

Mr. CIPRIANO. Yes, we have a——

Mr. HALL [continuing]. Who are more knowledgeable in specifics than you are about specifics, but you rely sometimes on, on those as you arrive at your final calculations?

Mr. CIPRIANO. Yes, sir.

Mr. HALL. And of the 1,600 quadrupole magnets that I'm told—some—by someone, that a contract's about to be awarded.

Mr. CIPRIANO. Yes.

Mr. HALL. There's no contract on the 8,500 or so dipoles at this time?

Mr. CIPRIANO. The contracts have been submitted to my office, we have reviewed them. They are within cost base line, we have approved them. There's an anticipatory cost clauses have been granted, so the contractors are working and they are signed by the contractors, General Dynamics and Westinghouse. There's an administrative review process that is ongoing at DOE Headquarters that we'll complete in the next few days.

Mr. HALL. Well, and I'm also told, and I'd like for you to confirm it, that a contract is scheduled to be awarded for the final design and initial production for quadrupoles that will be awarded ahead of schedule and under budget.

Mr. CIPRIANO. Yes, sir.

Mr. HALL [continuing]. Significantly under budget.

Mr. CIPRIANO. Yes, sir. That contract has also been signed by, Babcock and Wilcox and we have received that and reviewed that in our office.

Mr. HALL. And Mr. Bush is the man that holds a magnet contractors feet to the fire on the cost and production schedule?

Mr. CIPRIANO. Yes, sir.

Mr. WOLPE. Will the Gentleman yield just for an additional—if you could——

Mr. HALL. Yes.

Mr. WOLPE. What is the sum of the contract, dollar amount?

Mr. CIPRIANO. To Babcock and Wilcox, $62 million——

Mr. HALL. That's $62 million?

Mr. WOLPE. Thank you.

Mr. CIPRIANO [continuing]. Rounded off.

Mr. HALL. I guess I could better use the last half a minute that I have left to sum it up, or asking you if you agree with the statement I'm about to make, that this panel is comprised of men knowledgeable in nuclear weapons, physicists, Ph.D.s—several, and the panel that came here that panned this project somewhat as I understood them, were made up of one with a liberal arts degree, one bachelor of business and a bookkeeper. I think the record should reflect the calibre of testimony that the committee has received. And I yield back my time, Mr. Chairman.

Mr. WOLPE. Does that conclude your questioning, Mr. Hall?

Mr. HALL. I was just stating a matter of fact there for the committee. There's no charge for it. [Laughter.]

Mr. WOLPE. I would, yes.

Mr. HALL. And it was a highly prejudiced statement.

Mr. WOLPE. I think it's important to note that there's not in the history of American Government experience, from the Pentagon over to the Department of Energy necessarily, any direct correlation with technical and scientific expertise and commitment on the one hand and the ability to management, manage costs on the other. And in fact, as we all know, in fairness to this GAO team, their report is based upon interviews with people, experts that do

have the scientific and technical credentials and that's the basis of it. They performing a reporting function and an evaluation as to the management capabilities and cost controls that are in place.

Mr. HALL. Mr. Chairman, yield for just a moment, sir?

Mr. WOLPE. Sure.

Mr. HALL. The Chair would surely agree with me too that a contract of this magnitude awarded ahead of schedule and significantly under budget is due some accolades.

Mr. WOLPE. It compensates for some great cost escalation that has already occurred, even prior to construction, from the original projections that were made, we're still way above the original projections on cost.

Mr. HALL. And I guess you'd have to crank into there, the track record for High Energy Physics projects, with regard to cost and schedule for the DOE, has been good.

Mr. WOLPE. Well, let's go a little bit further in the questioning. I think we may identify some other areas of legitimate concern, I think, from the taxpayer's standpoint.

I'd like to take you at this point to a different question. I want to come back to this issue of the work break down schedule six and the SSC lab cost estimates. What exactly is that for? What does that item refer to?

Mr. CIPRIANO. WBS six covers operating costs after the machine is commissioned.

Mr. WOLPE. But, what is it specifically? What lab cost estimates are involved here?

Mr. CIPRIANO. It would be the costs of physics research for planning experiments, the costs of the personnel required to operate the machine, first of cost comparisons.

Mr. WOLPE. This consists of the technical and administrative functions required to establish and operate the SSC lab, is that correct?

Mr. CIPRIANO. To operate it after the machine is commissioned, the cost of establishing it prior to the commissioning of the segments of the machine are included in the total project costs. WBSs one through five.

Mr. WOLPE. The lab has done a cost work up of what they anticipate spending on this, between fiscal year 1993 and fiscal year 1999. And they indicated it will be $507 million. ICE recommended that you include this in the project costs. Did you do that?

Mr. CIPRIANO. We did not.

Mr. WOLPE. Why not, because you considered the cost of establishing the lab and having it flourish not to be part of the cost of building the accelerator. Is that what you're telling us?

Mr. CIPRIANO. The logic for doing it the way we did— and you can argue it both ways obviously—was that——

Mr. WOLPE. That is a very accurate statement.

Mr. CIPRIANO. We wanted to box the costs that were associated with the construction and the tests of the laboratory as one number and try to remove as many variables from that number as we possibly could, so that we could manage to very well.

The costs that are associated with operating a laboratory or pieces of it as it becomes commissioned, will be determined by what kinds of experiments or how the equipment is used by the high

energy physics community or the medical committee or whoever the users might be of the machine——

Mr. WOLPE. Isn't the——

Mr. CIPRIANO.—because it's better that they determine what those costs should be and that those be budgeted in a separate place.

Mr. WOLPE. But, isn't it accurate to say that there would not be a lab without an accelerator, there would not be an accelerator with the lab?

Mr. CIPRIANO. Yes.

Mr. WOLPE. I think it is that, on the mental reality, that I think calls into question, the logic of disaggregating these items.

So, you did not include the costs of spares, and you did not include the cost of the work breakdown structure 6.0 items.

Mr. CIPRIANO. That's the same thing.

Mr. WOLPE. Right. At this point, I ask consent that an SSC lab letter dated February 12, 1991, be entered into the record. That is a memo from Mr. Edward Siskin, the general manager of the lab, to Mr. Joseph Cipriano, the SSC Project Director.

[The memo from Edward J. Siskin dated February 12, 1991, follows:]

Superconducting Super Collider Laboratory
2550 Beckleymeade Avenue
MS 1080
Dallas, TX 75237-3946
(214) 708-1103 • FAX (214) 708-0001

General Manager's Office

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February 12, 1991

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U.S. DEPT OF ENERGY
SSC PROJECT OFFICE

Mr. Joseph R. Cipriano
SSC Project Director
Department of Energy
2550 Beckleymeade, Mail Stop 1020
Dallas, Texas 75237-3946

Dear Mr. Cipriano:

The SSCL received your letter dated January 8, 1991, asking the SSCL to certify that we are prepared to execute the SSC Project with a total project cost of $8.249 billion and a project completion in FY 1999. This is consistent with the recent joint presentation by DOE and SSCL to officials of the Office of Management and Budget (OMB). The attachment to the above noted letter shows the annual funding requirements and the cost detailed to the third level of the WBS for WBS Elements 1.0, 2.0, 3.0, 4.0 and 5.0. These WBS Elements make up the total project cost and total the $8.249 billion. (Please note that the attachment to the above noted letter totals $8.247 billion. The $8.249 billion is obtained by adjusting the FY99 cost by the $1.7 million that was reduced in FY92.)

The SSCL fully intends to execute the SSC Project consistent with the scope as stated in the conceptual design report to the cost of $8.249 billion. The associated Laboratory costs identified in WBS 6.0 and costs for operational spares are required to accomplish this project.

Attachment 1 to this letter shows the split of the FY91 funds to the third level of this WBS.

The allocation of the FY91 funds to the divisions is necessary because the funding for WBS 6.0 is now forecast to start in FY93, and these functions currently exist and are necessary prior to FY93. These costs are currently being charged with similar costs in WBS items 4.0 and 5.0. These costs will be recouped in future years when funding exists.

The budgets for the Technical Divisions are lower than the presentation to OMB. However, the $50.0 million management reserve will be used by these divisions where needed and where the schedule can be improved.

If additional information is required or you would like to discuss this further, please contact us.

Sincerely,

Edward J. Siskin
General Manager

EJS/RW/le

Attachment

cy: R. Schwitters
P. Reardon
L. Sluiter
R. Williamson
Central File

2.7

Attachment I

SSC PROJECT BASELINE
IMPACT OF FY91 BUDGET
FUNDING PROFILE
($ in 1000)

BASELINE (10 YEAR SCHEDULE)

WBS	DESCRIPTION	FY90	FY91	FY91 BUDGET PLAN	FY91 BUDGET BO	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	TOTAL
111	ACCELERATOR MANAGEMENT	200	2,570											
112	LINAC SYSTEM	0	12,467											
113	LEB SYSTEM	0	0											
114	MEB SYSTEM	0	0											
115	HEB SYSTEM	0	0											
116	COLLIDER SYSTEM	1875	20,000											
117	TEST BEAM	0	0											
118	GLOBAL ACCELERATOR SYSTEM	0	3,870											
	SUBTOTAL 1.1	2,075	49,000	34,857	30,257									
121	MAGNET MANAGEMENT	2,400	3,500											
122	HEB MAGNET ACQUISITION	0	0											
123	COLLIDER MAGNET PRODUCTION	11,400	60,000											
124	MAGNET EQUIPMENT DEVELOPMENT	0	28,000											
	SUBTOTAL 1.2	14,701	91,572	20,000	71,000									
211	CONVENTIONAL CONST ADMIN	16,914	2,000											
212	LINAC FACILITY	0	2,870											
213	LEB FACILITY	0	0											
214	MEB FACILITY	0	0											
215	HEB FACILITY	0	0											
216	COLLIDER FACILITY	0	0											
217	TEVE BEAM FACILITY	0	0											
221	I&C REGION I FACILITY	0	0											
222	I&C REGION II FACILITY	0	0											
223	I&C REGION III FACILITY	0	0											
224	I&C REGION IV FACILITY	0	0											
225	SUPPORT FACILITIES	0	0											
231	[illegible]	0	0											
232	[illegible]	0	4,000											
233	[illegible]	0	0											
241	CENTRAL UTILITY FACILITY	0	0											
242	UTILITY DISTRIBUTION	1,410	10,000											
243	ACCELERATOR FACILITY	0	5,000											
244	ENVIRONMENTAL FACILITY	0	0											
25	OTHER	6,840	10,130											
	SUBTOTAL 2.0	25,164	87,000	21,000	41,000									
31	[illegible]	2,700	2,870											
32	[illegible]	2,400	2,870											
	SUBTOTAL 3.0	5,100	5,870	5,000	5,000									
411	ACCELERATOR PROJECT	0	5,000	5,000	5,000									
412	MAGNET PROJECT	36,700	11,000	11,000	11,000									
	[illegible]	33,577	37,000	18,000	18,000									
	SUBTOTAL	308,700	308,700	200,000	200,000									
	ESCALATION	0	8,700	INCL	INCL									
	CONTINGENCY	0	10,130	10,000	10,000									
	MANAGEMENT RESERVE			90,000	90,000									
	PROJECT TEC	308,700	308,700	300,000	300,000	603,707	716,000	972,707	1,014,331	1,000,000	874,000	800,000	117,000	6,700,000

SSC PROJECT BASELINE
IMPACT OF FY91 BUDGET
FUNDING PROFILE

BASELINE (10 YEAR SCHEDULE)

($ in 1990)

WBS	DESCRIPTION	FY90	FY91	FY91 BUDGET PLAN	FY91 BUDGET BO	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	TOTAL
4.1	ACCELERATOR PRE-CONSTRUCTION	0	0	0	0									
4.2.1	ACCELERATOR No.1	38,000	48,000	48,122	48,122									
4.2.2	MAGNET No.9	39,875	48,875	51,000	51,000									
	FY90 & FY99 COST													
	[illegible]	4,210	30,240	38,494	38,494									
4.9	LAB ENVIRONMENTAL SUPPORT	994	3,210											
5.1	INJECTION SYSTEM R&D	28,541	13,000											
5.2	DETECTOR	11,000	12,994											
5.3	[illegible]		3,100											
	[illegible]	32,000	39,077	38,418	39,418									
	FY90 & FY99 COST													
	SUBTOTAL	97,000	148,176	187,894	189,894									
	ESCALATION	0	3,740	INCL	INCL									
	TOTAL OTHER COST	97,000	148,516	187,894	189,894	148,000	198,212	164,843	183,778	205,271	228,736	255,000	284,000	1,655,734
	TOTAL PROJECT COST	195,000	400,000	400,000	400,000	672,700	871,100	1,127,000	1,164,100	1,200,700	1,101,000	910,000	200,000	8,000,000

SSC PROJECT BASELINE
IMPACT OF FY91 BUDGET
FUNDING PROFILE

($ in 1990$)

BASELINE (10 YEAR SCHEDULE)

WBS	DESCRIPTION	FY90	FY91	FY91 BUDGET PLAN	FY91 BUDGET BO	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	TOTAL
0.1.1	PHYSICS ACMR & SUPPORT	0	0	0	0	0	1,189	1,189	1,189	1,189	1,189	1,189	1,189	8
0.1.2	PHYSICS THEORY	0	0	0	0	0	941	1,314	1,539	1,799	1,899	2,011	2,011	11,514
0.1.3	EXPERIMENTAL PHYSICS	0	0	0	0	0	3,996	5,336	7,036	8,781	10,647	11,494	12,000	59,290
0.1.4	COMPUTING & DATA ANALYSIS	0	0	0	0	0	899	925	1,165	1,736	2,482	3,000	3,000	13,207
0.1.5	ACCELERATOR PHYSICS	0	0	0	0	0	1,437	1,440	1,440	1,440	1,440	1,440	1,440	10,077
0.2.1	LIBRARY SERVICES	0	0	0	0	0	1,661	1,661	1,661	1,661	1,661	1,661	1,661	11,627
0.2.2	TECHNICAL PUBLICATIONS	0	0	0	0	0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	7,000
0.2.3	DIRECTORATE OPERATING	0	0	0	0	0	731	731	731	731	731	731	731	5,117
0.2.4	ADMINISTRATIVE OPERATING	0	0	0	0	0	2,484	2,487	2,487	2,537	2,487	2,487	2,487	17,456
0.2.5	L.T.S OPERATING	0	0	0	0	0	4,681	9,899	12,154	13,479	13,799	13,799	13,799	81,610
0.3.1	ACCELERATOR DIV OPERATION	0	0	0	0	0	1,299	1,749	2,799	14,481	24,445	30,000	30,000	154,773
0.3.2	MAGNET DIV OPERATIONS	0	0	0	0	0	0	0	0	0	0	0	0	0
0.3.3	PHYSICS DIV OPERATIONS	0	0	0	0	0	392	1,892	4,339	8,418	4,500	4,500	4,500	28,541
	SUBTOTAL	0	0	0	0	0	21,101	30,000	36,272	57,104	69,000	74,000	100,000	409,477
	ESCALATION	0	0	0	0	0	2,200	4,300	8,000	12,000	17,000	24,000	34,000	101,500
	TOTAL WBS 0	0	0	0	0	0	23,301	34,300	44,272	69,104	87,000	98,000	134,000	510,977

SSC PROJECT BASELINE
IMPACT OF FY91 BUDGET
FUNDING PROFILE
(S in 1990)

BASELINE (10 YEAR SCHEDULE)

WBS	DESCRIPTION	FY90	FY91	FY91 BUDGET PLAN	FY91 BUDGET BO	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	TOTAL
TPC FUNDING SOURCE														
DOE														
ESCALATION (DOE FUNDS)														
TEXAS														
OTHER														
TOTAL FUNDING														

FY 92 & FY 99 FUNDS
TOTAL

The first two paragraphs read as follows, in this letter Mr. Siskin verifies that the SSC can be built to $8.2 billion. And then he writes, and I'm reading a portion of this, "the attachment to the above letter shows the annual funding requirements and the costs detailed to the third level of the WBS—" that's work breakdown structure, I had to ask this question to get the acronym straight—"for WBS elements, 1.0, 2.0, 3.0, 4.0, and 5.0. These WBS elements make up the total project costs and total the $8.249 billion."

Then he goes on in the next paragraph, "The SSCL fully intends to execute the SSC project consistent with the scope as stated in the conceptual design report to the cost of $8.249 billion. The associated laboratory costs identified in WBS 6.0 and costs for operational spares are required to accomplish this project."

Now, let me, you know, Mr. Cipriano, read that last sentence again. "The associated laboratory costs identified in WBS 6.0 and costs for operational spares are required to accomplish this project." And let me direct your attention to the fourth paragraph. "The allocation of fiscal year 1991 funds to the divisions is necessary because the funding for WBS 6.0 is now forecast to start in fiscal year 1993 and these functions currently exist and are necessary prior to fiscal 1993. These costs are currently being charged with similar costs in WBS items 4.0 and 5.0. These costs will be recouped in future years when funding exists."

I find that incredible. This memo indicates the total project costs of $8.249 billion is made up of WBS items one to five alone, and that while the Department denies that spares and WBS six items should be counted against the project cost, the general manager of the project explicitly states that they are essential to accomplish this project. In fact, laboratory operations are so important that they're already being paid for by dipping into other budgeted accounts. Do you have a reaction to that? I mean——

Mr. CIPRIANO. Well, I think the extent of that—and perhaps Mr. Siskin can add on this—the extent of that is very small at the beginning, and I think that——

Mr. WOLPE. That's not the point, I'm trying to get at the principle here.

Mr. CIPRIANO [continuing]. Something for a library. But, yes, that's true and we have that budget identified in 1993 and in the out years, and the hires—and it's part of the High Energy Physics Operating Budget. And that's where those dollars are budgeted.

Mr. WOLPE. So the Department's official budget numbers are only a portion of the true costs of the project. You're saying it's a large portion, but it's not the total.

Mr. CIPRIANO. The total project cost is—includes all the costs that are represented to be included in it, in the cost report.

Mr. WOLPE. Well, what about the numbers you just, what about the costs you just identified?

Mr. CIPRIANO. We stated in the cost report that those were not included in the total project costs.

Mr. WOLPE. So, the Department's official budget numbers are only a portion of the true cost of the project, in fact, after you add the lab operations and spares back into the cost, as well as foreign contingency, you end up with an official number—using DOE numbers here, not talking about the other estimates of $9.1 billion.

Even if you can build it to cost and schedule, which I think there's some serious legitimate questions about, you have a total taxpayer cost that is almost $4 billion higher than the original estimate presented to Congress back in 1987, and higher even than in those we've been using earlier this year. Is that not correct?

Mr. CIPRIANO. That is correct.

Mr. WOLPE. Mr. Gibbs, well let me, let me yield now to Mr. Boehlert here.

Mr. BOEHLERT. Can we have the chart that we have prepared, the staff chart which can help us work through this question of total project cost.

As you can see Mr. Gibbs, on that, that chart, giving the Department credit for the $875 million Texas has pledged to the project and the $50 million that India will probably give to the project, that reveals that the total taxpayer cost is $8.15 billion. That is $2.5 billion higher than the Department's much advertised number of $5.6 billion. Where was the money for the non-budgeted project cost items going to come from, Mr. Gibbs?

Mr. GIBBS. I'm sorry.

Mr. BOEHLERT. Where is the money for the non-budgeted cost items going to come from?

Mr. GIBBS. The total project cost items of the—totalling to the $8.249 billion will come out of the construction appropriations for the construction project. And that's what is reflected there. The $506 million that you're referring to in terms of lab and physics operations will be budgeted as a separate line item, within the High Energy Physics operating budget, to fund those kinds of activities that, that program is designed to fund at other laboratories as well as at this laboratory and that's the $506 million. And that includes the spares cost.

The $219 million in foreign contingency, as I mentioned earlier, looking ahead at what kinds of contributions we expect in terms of the magnitude, you know, significant, large contributions, we expect those largely to be in-kind and that is not in, that contingency is not there. If we were to get all those in-kind contributions and—as we have projected, then we would have $200 million. If we included that $219 million, we'd have $219 million extra in contingency from a U.S. dollar point of view that we, that we don't feel we need. And that's why it was adjusted the way it was. What you're reflecting then, of course, is the cost report and the baseline, is that it's a combination of when you complete it, the total dollars and the funding profile and so if you do something that significantly distorts that profile from what is reflected there, that then could have an effect of adding cost or time, both of which cost money.

Mr. BOEHLERT. Well then, are you going to come back to us and say, "Well, gee, we're sorry it didn't work out the way we had hoped"?

Mr. GIBBS. The $506 million that you're referring to in terms of lab and physics operations will be budgeted as a separate line item within the operating budget to fund those kinds of activities that that program is designed to fund at other laboratories as well as at this laboratory. That's the $506 million, and that includes the spare cost.

The $219 million of foreign contingency, as I mentioned earlier, looking ahead at what kinds of contributions we expect in terms of the magnitude, significantly large contributions, we expect those largely to be in-kind, and that contingency is not there.

If we were to get all those in-kind contributions, as we have projected, if we included that $219 million, we would have $219 million extra in contingency from a U.S. dollar point of view that we don't feel we need. That's why it was adjusted the way it was. And what you're reflecting then, of course, is that in terms of commitments, we don't have any commitments beyond the $50 million that you've identified for India.

Mr. BOEHLERT. Don't the Indians, incidentally, have some people on site right now?

Mr. GIBBS. Yes, they do.

Mr. BOEHLERT. Is that correct?

Mr. GIBBS. Yes.

Mr. BOEHLERT. How many are there?

Mr. SISKIN. Something like 10, I guess.

Mr. BOEHLERT. At whose expense?

Mr. SISKIN. The Indian government is paying their salaries and we're paying for their expenses to maintain them here.

Mr. BOEHLERT. You're maintaining them here, and they are here to determine what kind of recommendation they might make to their host government as to how they can participate in the project.

Mr. SISKIN. Partly that, and partly they are doing hard work that I would have otherwise had to use local scientists to do. They are doing some radio frequency calculations and other work like that.

Mr. BOEHLERT. I just can't let my good friend Mr. Hall's comment go without some response. I always enjoy his commentaries. As he well knows, I had initially been a supporter of the superconducting super collider, in fact, supported it after Texas was selected as a site, not ever arguing that it was good science, I just have a very real concern about total taxpayer cost.

There are a lot of uncertainties here, and that concerns me. But Mr. Hall has a good memory so he will recall that I was very much concerned that DOE ruled out completely any consideration of a possible transborder site—incidentally nowhere near my district. But our Canadian neighbors to the north were interested in exploring that possibility. They were also interested in doing something that no one else seems interested in doing, putting money up front. But that was summarily ruled out by DOE.

I want the record to be absolutely clear that from the beginning I have supported the superconducting super collider, not because I thought it was a public works job project for my district, but because I thought it represented some interesting and promising science.

I continued that support after Texas was selected, but now I have some very serious reservations and some very serious questions. I have a fiduciary responsibility to this job, and I have to be worried about the total taxpayer's cost. I have to be worried about the viability of the project that is plagued with so many uncertainties. I

have to be worried about the direction in which science is proceeding in this Nation.

So let me make it clear to all of you. I want to work cooperatively with you. I want to advance science. I am a cheerleader for science. But the fact of the matter is that when we're establishing priorities, and when we have limited resources, I have to get more serious about how I look at science. That is what is prompting this hearing.

We have come with an open spirit. We welcome the Texas delegation's participation in this—Mr. Hall and Mr. Geren——

Mr. HALL. Would the gentleman yield for a compliment? [Laughter.]

Mr. BOEHLERT. I will certainly yield and I will field this compliment very carefully. [Laughter.]

Mr. HALL. I think the gentleman is just a super Member of this Committee, very knowledgeable, very perceptive, hard-working, excellent Member of Congress, and did change your mind at one time. That's the reason I'm hoping that we'll get a good guy like you back on the right track. [Laughter.]

Mr. BOEHLERT. Thank you so much.

Mr. WOLPE. We had a bell that sounded indicating a roll call vote on the House floor, so we will recess at this point and resume our hearing at——

Mr. BARTON. Could I ask the chairman, How much longer do you expect this to go?

Mr. WOLPE. Well——

Mr. BARTON. Do you plan to let each of us make one round and that's it?

Mr. WOLPE. I fully anticipate that you will have the opportunity to ask another round.

Mr. BARTON. I mean, after this current round, do you and Mr. Boehlert intend to have another round?

Mr. WOLPE. Yes, we do have many questions still. Surely.

Mr. BARTON. All right.

Mr. WOLPE. We will resume as close to a 10 minute period as we can.

[Recess.]

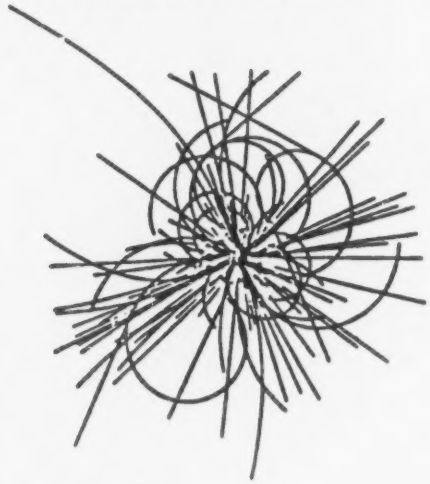
Mr. WOLPE. We will resume the hearing at this point.

I want to zero in at this point a little more deeply into this question of foreign participation. I want to ask unanimous consent to introduce selections of an October 1990 DOE report on the status of the SSC.

[The referenced report follows:]

SUPERCONDUCTING SUPER COLLIDER

STATUS REPORT



OCTOBER 1990

U. S. DEPARTMENT OF ENERGY

SSC STATUS

EXECUTIVE SUMMARY

In January 1990, a revised design for the SSC was approved. This revised design increased the cost from the earlier estimate of $5.9 billion to about $8 billion. The Department has subsequently developed a project baseline with a cost of $8.244 billion and scheduled completion in FY 1999.

Total foreign contributions for the SSC are targeted at $1.7 billion, an amount that is highly unlikely without a significant investment by Japan and the Soviet Union; other countries, although interested in the proposed partnership, will most likely not make significant contributions. Texas has committed to contribute $875 million to the cost of construction of the SSC, plus all the land.

Excellent magnet results have been achieved to date, with the current full-length 40 mm diameter dipole magnets exceeding specifications and key parameters of the 50 mm diameter design just demonstrated. General Dynamics and Westinghouse are under letter contract to begin engineering development and prototyping of the full-length 50 mm diameter magnets. We expect this final contract to be at or below budget.

Management has been substantially strengthened, with Edward Siskin recently appointed as General Manager, bringing large construction project management experience together with the strong technical expertise available at the SSC Laboratory. A DOE On-Site Project Director was also put in place earlier this year. The management team now exists to build the SSC on schedule and within budget.

Congress continues to be supportive. Both the House and Senate Appropriations Committees initially supported the requested $318 million for FY 1991; however, this amount was cut a net of $50 million in conference. Total Federal funds available for FY 1991 are $267 million which, with $149 million from Texas, totals $416 million, the FY 1991 baseline figure.

A decision needs to be made to continue the project in view of the final project baseline and foreign contribution situation. DOE recommends continuation.

SSC STATUS

ASSESSMENT OF INTERNATIONAL PARTICIPATION

- **Total foreign contributions for SSC construction is targeted at $1.7 billion ($8.244 billion TPC, one-third non-Federal equal to $2.748 billion, less $.875 billion from Texas, less $.219 billion adjustment for foreign contingency, equals $1.7 billion)**

- Attaining this amount without a significant investment by Japan is very doubtful

  Japanese participation is highly unlikely without intervention on the part of President Bush with Prime Minister Kaifu

- The next major potential contributor is the Soviet Union

  The Soviet Union is clearly interested, but has worrisome domestic and infrastructure problems; SSC cooperation needs to be part of the Bush-Gorbachev Summit process

  The SSC Laboratory has just recently signed an MOU with the Soviet Co-Chair of the Joint Coordinating Committee for the Fundamental Properties of Matter for cooperation on accelerator science and technology, including the SSC

- Italy is also possibly a contributor, but it is unclear at this time how significant and what form that contribution would take

- Other countries in Western Europe are unlikely to make significant contributions for the next several years, or perhaps never if CERN's LHC is constructed

- Canada, along with India and Korea, may make contributions, but will likely be limited

- Interest in international participation in detectors, although not formally a part of this partnership approach, remains high

- The U.S. may, therefore, with Texas support, need to carry most of the cost of constructing the SSC for several years (significant foreign contributions may not be forthcoming through the mid-1990s)

ASSESSMENT OF INTERNATIONAL PARTICIPATION SUPERCONDUCTING SUPER COLLIDER (SSC)

In May of this year, with the concurrence of OSTP, State, and OMB, the Department of Energy decided that the SSC should be constructed and operated in partnership with other nations and that the SSC Laboratory should be an international facility. This decision was based on the judgement that no nation or region could be expected to make the size of investments requested without some role in management of the SSC. In June, a U.S. Government delegation went to Japan and Korea, presenting a letter of invitation to SSC partnership from the President, and in September a DOE delegation went to the major European capitals to explore their level of interest in participating in the construction and operation of the SSC. There have been technical discussions with India and other nations, and we are now seeking clearance from the Department of State to open discussions with the USSR which has expressed an interest in participation to Secretary Watkins and other senior Department of Energy officials.

As a result of these efforts, we believe that we are unlikely to meet the Administration's goal for non-Federal participation (one third of the total project cost) in the foreseeable future. While both India and Korea have expressed interest in participation, their actual offers would likely provide only limited support to SSC construction. The SSC does not have the complete support of the Japanese physics community, and the Japanese Government has stated that any decision will take at least a year to make, and will likely require a new budget category and possibly some realignments among their science agencies. The major European nations have indicated that their budgets are already strained to support the current demands of CERN and their national programs, and that their primary interest is to assure the long-term health of CERN. The Soviet expression of interest is potentially significant, and we are awaiting interagency clearance before we invite their participation. All countries are interested in participating in the SSC experimental program.

The current uncertain status of the SSC's cost, schedule and budget is also clear to potential partners, and we can expect no progress toward a significant commitment by any of them until Congress and the Administration reduce the uncertainties surrounding the program. Also, the concept of the SSC as an international laboratory, while attractive, is still not fully understood.

To obtain significant foreign investment in the construction of the SSC will require the U.S. Government to demonstrate a sustained commitment to the project, and significant progress on the part of the program. Congress and the Administration will have to be willing to proceed prior to securing major commitments from foreign partners for some time, and it is quite possible that the Federal Government and the State of Texas will have to carry most, if not all, of the full cost of the SSC through the mid 1990s. Our efforts at securing international participation are also affected by other U.S. large science projects, in particular, the space station. We may need the help of the White House in answering such broad policy issues as the long-term reliability of U.S. commitments to large projects, and the differences between the Federal budget process and those of other countries.

We have been told by Japanese officials that raising the SSC in discussions between President Bush and Prime Minister Kaifu is a prerequisite to a positive Japanese response, since the Japanese decision to participate is driven much more by political considerations than by a consensus of scientists. The Japanese have noted that the SSC was not raised in the two most recent Summit meetings.

We are pursuing our international strategy, focusing first on those nations which have demonstrated interest in partnership, thereby demonstrating further the viability of the SSC as an international project. We will continue to emphasize the value of an SSC partnership to the U.S.-Japan relationship and to Japan's effort to internationalize further its science programs. We will also work with Europe to coordinate our programs for high energy physics and, in particular, to explore areas where coope ation between CERN and the SSC may be complementary and mutually beneficial.

Specific actions we propose in the near term implementation of this strategy include:

- Work with the White House and State to assure that the President expresses his strong desire that Japan become a partner in the SSC program at his next bilateral meeting with Prime Minister Kaifu

- Continue to keep the Japanese Government informed on progress in the SSC program

- Approach the Soviets through the U.S.-Soviet Summit process to participate in the construction of the SSC.

- Begin the negotiating process with India and Korea

- Formally approach Canada about participating in the SSC

- Encourage other countries, such as Mexico and Brazil, to become involved in the SSC

As we execute this strategy, it would be extremely useful if key Congressional figures were to express support not only for the SSC but for international partnership in the SSC.

As we carry out these actions, given the current situation, there is no guarantee of success. However, without such an effort there is little, if any, likelihood of substantial foreign participation in the construction of the SSC.

Western Europe

The U.S. and European programs are in a similar position. Neither has the resources to meet all the demands of the science of high energy physics (HEP). Each program needs a new machine to keep its infrastructure alive and to ensure continued excellence in this area of physics research. Europe is committed to preserving its investment in CERN but as a consequence it must use the existing 27 km tunnel built for its newest machine, the Large Electron Positron collider (LEP), for its next machine, the Large Hadron Collider (LHC). It cannot afford to build a larger tunnel, in part because CERN Member States are still paying off mortgages for LEP, and to make the LHC a forefront facility, CERN is pushing, if not exceeding, the limits of accelerator and detector technology. In contrast, the SSC was designed to optimize physics research based upon an extension of existing, proven technology, which requires an 87 km tunnel. Both the LHC and SSC projects are seeking substantial international participation to reduce the cost to the CERN Member States and the U.S. taxpayers, respectively. Also, as in the U.S., European governments are facing concerns about "Big Science" versus "Little Science."

Based upon a recent tour of European capitols by DOE officials in early October, the current situation in each major country is as follows:

Italy

Italy is fully committed to the continuation of CERN and the LHC program and currently claims not to have the means within its present science budget to participate in the construction of the SSC. Italy is strongly behind the LHC program because the Director General of CERN, Carlo Rubbia, is an Italian National and a Nobel laureate, and because of their large investment in CERN. Italy is interested in and planning for participation in the SSC experimental program (the design, construction, and operation of detectors, and the subsequent analysis and publication of results obtained); however, the amount of resources available is unclear.

France

France is committed to the continuation of CERN and the LHC. France will make no decision on support to the SSC until a decision is made on the LHC, which will not come before December, 1991 at the earliest, and may well be one or two years later. There is interest in the experimental program of SSC (that is, in participating in the development of detectors and using them for the conduct of experiments), but not in the construction of the SSC. The French budget for HEP is not expected to grow in the foreseeable future. If the LHC is not built, France's interest in the SSC experimental program could become greater.

Germany

A major part of the German HEP budget is set aside to meet its long-term commitment to CERN and its domestic Laboratory, DESY (Deutches Elektronen-Synchrotron). For planning purposes, Germany believes that the LHC will go forward but not as fast as CERN may wish. Germany is currently providing support to four detectors at CERN and two at their new accelerator, HERA (Hadron-Elektron Ring Anlage) at DESY, and scientists are already talking about upgrades. The German budget also has to support its university groups from the very limited resources left after the commitments to CERN and DESY are met. In addition, a review of all basic research is currently underway, and the HEP budget may be tapped to help rehabilitate research laboratories in Eastern Germany. Under these circumstances, the Germans indicate that they will not have funds to help in the construction of the SSC. If university groups want to become involved in the SSC, they will have to compete for funds against CERN and DESY activities.

United Kingdom

The British HEP budget is committed for the next ten years to DESY and CERN. The British believe that the LHC will be built;

it is only a question of schedule. The British are interested in the SSC experimental program and would help in detector development where possible, but they claim not to have any resources available to support construction of the SSC accelerator.

Finland

The Finns become a full Member State of CERN January 1, 1991. They will start paying their dues on a graduated basis for the next five years. The Finns are interested in the SSC -- as well as the LHC -- as a way to stimulate their industry. Any SSC contributions would be relatively small and in the form of subsidies to Finnish institutions related to accelerator or detector R&D.

Switzerland

Since part of CERN lies on Swiss soil and Swiss industry has been a major beneficiary of CERN contracts, the Swiss government strongly supports CERN and its LHC project. Swiss institutes are involved in an SSC detector proposal and would likely participate in the eventual construction of a detector.

Conclusion

The Europeans have a large investment in and a strong commitment to CERN. The future health of CERN depends on its having a major new facility around the end of the decade. At present, the LHC is the only viable candidate. We are told that such a project will more than saturate the present European HEP budgets and not allow European participation in the construction of the SSC. Moreover, a decision to provide additional funding, specifically for the SSC, would require a major policy decision at the highest levels by one or more of the European governments. If the LHC were to falter for some reason and be replaced by a less expensive, new project, some funding for the SSC might become available, possibly for SSC construction, but more likely in the form of increased participation in the

SSC detectors. Such a negative decision on the LHC is not likely, however, for at least three or four years.

Japan

Japan has the potential of being the largest contributor/partner in the construction of the project. Presently, the Japanese seem to be playing a wait-and-see game. They have no strong incentive or domestic lobby driving the Government to make a decision. The domestic lobby appears to be a portion of the Japanese high energy physicists who would like to become a major partner in one of the large detectors proposed for the SSC, and possibly Japanese industry. The Japanese science community agrees that the SSC is good science, but is still wrestling with the possibilities of future high energy facilities in Japan, as well as the place of HEP within overall science priorities since major participation in the SSC would require a new, large appropriation of funds for basic research.

Politically, the Japanese do not sense any urgency. Japanese officials made it clear in June 1990, when the President wrote the Prime Minister to become a partner in the SSC, that a decision to participate on the terms requested by the U.S. would require (1) at least a year for them to reach a decision, and (2) the involvement of the Prime Minister because of the size of the suggested contribution ($2 billion plus) and the lack of a match between DOE and any one of their three organizations responsible for science and technology. Japanese officials have noted that the President's invitation of June 1990, has not been followed up in either the July or September meetings between the President and the Prime Minister, and have interpreted this as a sign of the Administration's priorities. Consequently, there has been no movement by the Prime Minister's office to respond to the invitation.

The Japanese are also concerned about uncertainties in the SSC cost estimates, the Federal budget process, and other large international science projects such as the Space Station and the International Thermonuclear Experimental Reactor (ITER).

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The Soviet Union

The Soviets could become a significant partner, perhaps the second largest foreign contributor, in the SSC program. The Department is awaiting foreign policy clearance from the State Department before approaching Soviet officials. United States scientists are working with their Soviet colleagues in the design of all three large detector candidates for the SSC, and have been told that the Soviets are prepared to commit resources to fund the cost of at least one-third of a large detector. Support for construction is an open question but senior Soviet officials (Ministerial level) have indicated an interest if they are invited and if the facility will be an international laboratory. Technology transfer should not be of concern due to the specific nature of the technologies involved; furthermore, the Soviets are heavily involved with CERN and have been making contributions to the U.S. HEP program under a cooperative agreement since 1974. The Department has asked that U.S.-Soviet SSC cooperation be on the next U.S.-U.S.S.R. Summit agenda.

Canada

Canada is currently evaluating their subatomic physics programs. The Canadians must decide: (1) to fund a major nuclear-physics facility in Vancouver, and/or (2) to focus their future program on supporting SSC, and/or (3) to re-adjust their support to high energy physics research significantly. The Department understands that Canadian interest in the SSC is strong and is scheduled to talk to Canadian officials in November. However, substantive funding for construction is not anticipated because of the relatively modest size of their overall HEP program.

India

India has pledged to provide up to $50 million worth of in-kind contributions. The SSC Laboratory has prepared a draft plan of initial cooperation which is being sent to senior Indian scientists for their review. The plan proposes three areas for cooperation: radio-frequency cavities for the main collider ring, beam-loss detector systems, and components for beam transport lines for the linear accelerator connection to

the Low Energy Booster. Once the review by SSC and Indian scientists is completed, the plan is to be forwarded to DOE for its review.

South Korea

South Korea has prepared a proposal whose value to the SSC may be on the order of several tens of millions of dollars. The Koreans, in addition to scientific and engineering manpower, are interested in various technical areas, such as conventional magnets, power supplies, and high vacuum materials and ceramics. The SSC program is currently evaluating the scientific and technical merit of the South Korean proposal, and is preparing a counter proposal which will be used to start the negotiation process.

Taiwan

There have been indications of potential interest on the part of Taiwan which we will continue to explore informally. We are planning to brief the Taiwanese Science Counselor at the Taiwan's Coordination Council for North American Affairs in Washington on the SSC program in the near future to stimulate and assess further Taiwanese interest, and explore the possibility of Taiwan receiving or sending a technical delegation. Any contributions would have to come through a non-governmental source, e.g. a university in Taiwan.

Other Countries

In December, a workshop will be held in Mexico to stimulate the interest of Latin American countries in the SSC. There are currently no plans to raise the subject of cooperation with the PRC.

SSC STATUS

CONCLUSION

This group met once before to approve continuation of the project when it became necessary to increase its cost by $2 billion due to design changes. It is necessary to meet once again due to information developed since that meeting concerning foreign contributions.

The Reagan Administration established a goal/requirement that one-third of the project cost come from non-Federal sources. The only such source thus far is Texas' $875 million. We must, therefore, obtain the balance ($1.7 billion) from foreign contributions. At this point, there is no certainty we can accomplish that goal. If the President makes this a priority issue with Japan, there is a reasonable chance of success.

It would now seem appropriate that before additional Federal or Texas funds are expended, a decision be made to proceed, or not, considering the questions of whether the one-third figure is a goal or a requirement and the priority of this project with Japan.

The Department is now confident of the cost estimate and the new site management's ability to construct the project on time and on budget. We recommend that a decision be made to proceed.

Mr. WOLPE. Mr. Gibbs, you are familiar with this status report—the October 1990 status report.

Mr. GIBBS. Yes, I believe so.

Mr. WOLPE. Copies are being given to you right now.

You do recognize this document?

Mr. GIBBS. Yes, sir.

Mr. WOLPE. It's clear from the text of the document that it was written as a briefing document by the Department of Energy as background to a high-level interagency decision on whether to go forward with the SSC project or not. Is that correct?

Let me ask you to turn to the last page of this document. It is unnumbered, but it is entitled, "SSC Status Conclusion". The first three paragraphs read: "This group met once before to approve continuation of the project when it became necessary to increase its costs by $2 billion due to design changes. It is necessary to meet once again due to information developed since that meeting concerning foreign contributions. The Reagan Administration established a goal/requirement that one-third of the project cost come from non-Federal sources. The only such source thus far is Texas' $875 million.

"We must therefore obtain the balance, $1.7 billion, from foreign contributions. At this point, there is no certainty we can accomplish that goal. If the President makes this a priority issue with Japan, there is a reasonable chance of success.

"It would now seem appropriate that before additional Federal or Texas funds are expended a decision be made to proceed or not considering the questions of whether the one-third figure is a goal or a requirement, and the priority of this project with Japan."

Mr. Gibbs, there are many intriguing issues raised by this document. I would like to know what decision was made on the question of whether the one-third non-Federal is a goal or a requirement.

Mr. GIBBS. I'm sorry. I wasn't a participant of the meeting that you're referring to. This is in terms of being a briefing, so I can't give you an exact statement of the decision.

Mr. WOLPE. My question is not what took place at the meeting. My question is, What is the Department's position? Is the one-third non-Federal standard a goal or a requirement?

Mr. GIBBS. It is the goal of the Administration to obtain one-third of foreign contributions of the cost of the project from non-Federal contributions.

Mr. WOLPE. So it is not a requirement. It is a goal.

Mr. GIBBS. When we, as an Administration, work through each year from a budget request point of view, we certainly have that emphasis that we have that goal and——

Mr. WOLPE. This is one time that I really ask that you give a very precise response. Is it a goal, or is it a requirement?

Mr. GIBBS. It is a goal.

Mr. WOLPE. Thank you.

You're aware that it was not simply a goal as far as the House of Representatives was concerned. There was a requirement incorporated into the House authorization bill that at least 20 percent of the SSC project be offset with foreign contributions. While this

never became law, 309 Members of Congress voted for it, and the House, I believe, still takes that standard very seriously.

Moreover, isn't that accurate that the Department of Energy backed the House authorization bill?

Mr. GIBBS. I believe so, yes.

Mr. WOLPE. So what happened between March of 1990 and October to change the Department's position?

Mr. GIBBS. I don't believe it has changed, sir. I believe that from my perspective, and the Department's, it is a goal that we are trying very—that we take very seriously as well and are trying very hard to meet the language and intent of the authorization bill.

Mr. WOLPE. But the Department of Energy backed the authorization bill, and it wasn't a goal in that bill, and as you recall, that was a central element of what the legislation was all about, wasn't it?

Mr. GIBBS. Yes, sir.

Mr. WOLPE. I guess I'm tempted to make an offer to you. If I let DOE hang in there with its understated foreign contingency costs, if the Department will swear that the one-third non-Federal contribution is binding and not a goal. Does that sound like a reasonable kind of a deal?

Mr. GIBBS. It's not one I could accept today, sir.

Mr. WOLPE. This same document mentions that $1.7 billion is the goal—or I guess we'll call it goal now—is the goal for foreign participation. Let's tackle a really basic issue. How did DOE come up with the number $1.7 billion as the amount of funds necessary to reach the one-third non-Federal pledge? That is mentioned in the Department's baseline, and it has been widely repeated by DOE officials and the press. I have been baffled by that number for some time. In finally looking through this document, I think we have come to understand how you did the calculation to come up with $1.7 billion.

If you turn to the page titled, "SSC Status: Assessment of International Participation"—if I could ask the staff to place up there a second placard—I can't tell what's up there. I can't see.

Let me read the first paragraph from the page that I have just identified. "Total foreign contributions for the SSC construction is targeted at"——

Mr. BARTON. Mr. Chairman, if I can make a suggestion, why don't we put over there where not only you can see it, and I can see it, but the T.V. can see it, too.

Mr. WOLPE. All right.

Mr. BARTON. Why don't we just move the whole easel over there. Maybe even the audience can see it.

Mr. WOLPE. I think the question here is whether the television media from Texas will see it or whether the print media from the rest of the country will see it, but be that as it may——

Mr. BARTON. Mr. Chairman, this is your Committee.

Mr. WOLPE. Let me read the paragraph now. "Total foreign contributions for the SSC construction is targeted at $1.7 billion. That's $8.244 billion total project cost, one-third non-Federal equal to $2.748 billion, less $.875 billion from Texas, less $219 million ad-

justment for foreign contingency, equals approximately $1.7 billion."

Mr. GIBBS. Yes, sir.

Mr. WOLPE. What's wrong with that calculation, Mr. Gibbs?

Mr. GIBBS. I don't see anything wrong with it, can you?

Mr. WOLPE. Isn't it the case that you have in fact double subtracted the foreign participation number, that indeed you fail to add back into the foreign contingency, on the foreign side, what you took out from the American side of responsibility?

You subtracted the $219 million from the Federal contribution.

Mr. GIBBS. Right. That's again for the in-kind contributions.

Mr. WOLPE. Then you're subtracting $219 million from the foreign contribution.

Mr. GIBBS. The $219 million deals with the adjustment for foreign in-kind contributions. It is subtracted here because that's what it reflects is that adjustment for international participation.

Mr. WOLPE. You took the $219 million—you subtracted the $219 million to give to the $8.244 billion total project cost, correct?

Mr. GIBBS. Yes.

Mr. WOLPE. And now you're subtracting as well $219 million to get to $1.654. Is that not correct?

Mr. GIBBS. Yes.

Mr. WOLPE. So you have taken the same item and subtracted it twice.

Mr. GIBBS. If you're looking at the total Federal dollars that are required and the balance of non-Federal, I think it tracks. I understand what your question, but it is not a double subtraction in my mind.

Mr. WOLPE. I'm not sure—let me understand this. The question is, How do you get $8.244? You use the $8.25 million subtraction, the one-third non-Federal contribution on top, and the $219 million together.

Mr. GIBBS. Yes.

Mr. WOLPE. Now you also then subtract the $219 million in order to get the $1.654 billion.

Mr. GIBBS. In fact, I think if you don't subtract that, you end up doing exactly what you're concerned about, and that is counting the $219 million twice. If you left the number in there, since it had been taken out of the $8.249 billion, and if you left it in, you would show a goal of $1.8 something billion for foreign——

Mr. WOLPE. That's correct.

Mr. GIBBS. That's not what we need because we don't have that——

Mr. WOLPE. Maybe it's not what you need, but it doesn't make any sense to do it the way that you've done it.

Mr. GIBBS. We tried to do it in a way that would balance from a—if it's subtracted in one place, it needs to be subtracted in the other place in order to accurately reflect what the total dollars were.

Mr. WOLPE. I am obviously not explaining it well because there seems to be some——

Mr. CIPRIANO. You're suggesting that the number should be $1.8 billion?

Mr. WOLPE. Absolutely. Isn't that correct, Mr. Cipriano?

Mr. CIPRIANO. I haven't worked through the numbers.

Mr. WOLPE. You can't subtract your foreign contingency item as part of your foreign contribution and also subtract your foreign contingency item from your total project cost and not obviously be subtracting the same number twice in your calculations.

Mr. BARTON. Would the chairman yield just for a point of clarification?

Mr. WOLPE. Sure.

Mr. BARTON. What is the definition of foreign contingency versus the one-third non-Federal? Do we have a problem just by definition? Is that your question?

Mr. WOLPE. These are the Administration's calculations. I'm just going by——

Mr. BARTON. Maybe we should ask the panel. What is the definition of non-Federal and the definition of foreign contingency? Is the chairman correct in his implication that those are identical? I think that's his point.

Mr. GIBBS. If you started with an $8.244 billion number and had not made the adjustment, you would be at $8.4 something. Then you took one-third of that, you would then come up with a $1.8 billion number, I believe, for the foreign, but we had already made that adjustment of $219 million and that's why it was not considered—if you subtract it one place, you need to subtract it——

Mr. WOLPE. Let me try it another way.

Mr. BARTON. I was trying to help you, Mr. Chairman. I apologize.

Mr. WOLPE. I appreciate it. I need all the help I can get at this point, but I think that confuses rather than enlightens.

Let me try it this way. In order to identify the one-third non-Federal contribution, you divided by three and you came up with $2.748 billion, right?

Mr. GIBBS. Right.

Mr. WOLPE. Is not the foreign contribution everything that remains less the Texas contribution?

Mr. GIBBS. Yes.

Mr. WOLPE. So the only other subtraction you should make at this point, in order to get to the foreign contribution, is the Texas contribution, but that's not what you have done. You have subtracted the Texas contribution, and then you have subtracted foreign contingency, which is a double subtraction. What is the logic of subtracting a foreign contingency item when in fact the non-Federal is comprised of only two elements—Texas and foreign? You have established the one-third non-Federal, you subtracted the Texas, so is not the remainder the total foreign contribution required?

Mr. GIBBS. Yes, except——

Mr. WOLPE. And what is that number?

Mr. GIBBS. If you included the $219 million it would——

Mr. WOLPE. Why do you want to include the $219 million?

Mr. GIBBS. I thought that was your concern that we were subtracting it.

Mr. WOLPE. Why did you exclude——

Mr. GIBBS. If you included it, it would be $1.873 billion.

Mr. WOLPE. Of course. Is not the effect of real foreign contribution required for this project, $2.748 billion less the amount we are receiving from Texas, and does that not total out to $1.8 billion?

Mr. CIPRIANO. May I suggest that there is a different way of doing it? You could take $8.244 billion number and subtract out all the contingency, which is $843 million, and then divide by three and you come out with $1.7 billion.

Mr. WOLPE. No. You've struck out the contingency, did you not, before you get to the $8.2 billion.

Mr. CIPRIANO. You subtract the contingency out of the $8.2 billion so there is no contingency at all, divide by three and you come out with $1.7 billion.

Mr. WOLPE. The $8.2 billion, I believe you will discover already has the contingency taken out.

Mr. CIPRIANO. Right. But since we're not counting contingency on foreign contributions, if we subtract it out and then divide by——

Mr. WOLPE. My question is, Why subtract it out?

Mr. CIPRIANO. Because we're trying to——

Mr. GIBBS. It's an accounting adjustment to try to accurately reflect the one-third in non-Federal portion of the $8.244 billion. We can provide additional——

Mr. WOLPE. Let me just ask you this question directly. Is not the—I'm sorry to belabor this point, but I think it's kind of crucial here—is not the way you get to the foreign contribution to figure out the one-third total non-Federal and subtract the Texas piece of that? The remainder should be the foreign contribution.

Mr. GIBBS. That's a way of getting at it, yes.

Mr. WOLPE. Is there any other way of getting at it?

Mr. GIBBS. Except the $219 million had been subtracted initially and to properly—we're not looking for that contingency from the foreign contributors. So it would be an inaccurate way of reflecting the dollar value that we're looking for.

Mr. WOLPE. Are you saying that the total cost of the project is less than you have up there?

If you take away the Texas contribution, is not the remaining—isn't that the simplest way?

Mr. GIBBS. Except for the adjustment that had been made for the $219 million in foreign contingency.

Mr. WOLPE. I have a sense that there's a bit of an impasse here.

Mr. Boehlert, do you have anything you would like to add to this?

Mr. BARTON. As the proponent of the project, if your point is that it might take $1.8 billion in foreign contributions, I would concede that.

Mr. WOLPE. Thank you. It would be so nice if those who did the calculations would concede that because the calculation is in error, and the calculation has been used in policy. It makes no sense on its face.

Mr. BARTON. I would also like to let the record show that while you're showing Texas to be $875 million, there is another $125 million that they are going to spend on SSC related activities, their research in various universities around the country. So there is another $125 million coming.

Mr. WOLPE. But that is still not part of the total project cost. That is out of——

Mr. BARTON. I understand.

Mr. WOLPE. That's just a very generous commitment to the initiative.

Mr. BARTON. I understand that.

Mr. WOLPE. Let me yield to Mr. Boehlert.

Mr. BOEHLERT. Continuing on, Mr. Gibbs, paragraph two on the same page of this document describes reaching the one-third non-Federal participation pledge without Japanese contributions—describes it "as very doubtful". We've had——

Mr. GIBBS. I'm sorry. Which page are you referring to?

Mr. BOEHLERT. Paragraph two on the same page of the document you're on.

Mr. GIBBS. The last page.

Mr. BOEHLERT. They're not numbered. It's the third page—SSC Status.

You got it? Do you see it? These pages are not numbered. SSC Status Assessment of International Participation.

Mr. GIBBS. We have that I believe.

Mr. BOEHLERT. Paragraph two, "Obtaining this amount without a significant investment by Japan is very doubtful.

Mr. GIBBS. Yes, sir.

Mr. BOEHLERT. We know about the relationship we've had with Japan and the much publicized meetings between the President and the Prime Minister. Put aside Japan's contribution of $10 billion for Desert Storm and $3 billion they have pledged for refugee assistance to the Middle East, and the efforts by the Europeans to gain Japanese participation. Let's assume for a minute that those reports are accurate. Even if we could get every single penny of the billion dollars from the Japanese, plus the $50 million from India, that gives you less than 50 percent of what you need to meet your goal, which we think should be a requirement.

Now, I read the Department's description of other country's ability to make a contribution to the SSC. We hear a lot about it. Would you agree that it is a fair characterization of the Department's own position to say that even if the Japanese come on board with $1 billion, there isn't another $1 billion out there to be had?

Mr. GIBBS. We're not—if the Japanese were to come on board with $1 billion, we would still have a balance of about $650 million.

Mr. BOEHLERT. It depends on how we do the creative mathematics.

Mr. GIBBS. Right.

Mr. BOEHLERT. There are creative mathematics here. Let's say $600 million to $800 million.

Mr. GIBBS. There are a number of different countries that are very interested in this.

Mr. BOEHLERT. Let's go over some of the possible contributors.

Mr. GIBBS. Okay.

Mr. BOEHLERT. We keep hearing that the Soviet Union is a possible contributor. Has Mr. Moore made a trip to the Soviet Union?

Mr. GIBBS. He has one planned for early in July of this year.

Mr. BOEHLERT. But didn't he plan one before that was canceled.

Mr. GIBBS. There were several things going on in the Soviet Union at the time, yes.

Mr. BOEHLERT. So a trip has been planned and been canceled.

So the Department is aware of the political and economic disarray in the Soviet Union. In fact, on the assessment of international participation—and I'm referring to that page, that same page——

Mr. GIBBS. Okay.

Mr. BOEHLERT. On the assessment of international participation page you note that the Soviet Union is clearly interested but has worrisome domestic and infrastructure problems. I think that everyone can agree that that is an accurate assessment.

Even if the Soviets did decide to contribute components to the SSC, could we afford to take them? In other words, the economic and political disarray in the Soviet Union raises doubts about their ability to actually deliver components that meet the rigorous—and I underscore rigorous—quality standards of the SSC project, or just as importantly meets the project's tight schedule.

Is it the Department's position that there is sufficient padding of the schedule to tie ourselves to the ambiguities of Soviet production and delivery?

Mr. GIBBS. No, there is not that sufficient padding, as mentioned, in the schedule. We do have—even in spite of the worrisome nature of the domestic and infrastructure problems that are noted—we still have a continuing strong interest on the part of the Soviets to participate in this. I would like to turn over to Ed and maybe Tom to answer where that participation is going on right now and what we see the prospects—including the technical complexities, as you mentioned.

Mr. SISKIN. One of our key managers just got back from the Soviet Union last week and observed their manufacture. Despite many reservations about the Soviet Union's quality and schedule performance, in the area of accelerator design and component manufacture, their performance has been very, very good. In fact, it was reported to me only a few days ago that the Soviet Union is producing first class magnets of the sort that we would use in our middle energy booster at the rate of three a day and meeting standards that we would require.

So with respect to that experience, with respect to magnets they recently provided to the Stanford Linear Accelerator, if we can come to an agreement on certain of those packages, I feel very comfortable that they can meet our technical and scheduled objectives.

Mr. BOEHLERT. So we know the Soviets are interested.

Mr. SISKIN. Yes, sir.

Mr. BOEHLERT. I will concede that point. But there is no formal commitment. You will concede that point?

Mr. SISKIN. Yes, sir.

Mr. BOEHLERT. It's really not clear to me, or I think a good number of us here, in this town particularly right now given the circumstances that we would or shouldn't accept a significant Soviet participation, even if it is offered.

Let's look at Europe for a moment. Let's continue our travels.

The European accelerator center is proposing to build their own next generation machine. Let's review what the Department said

about major European countries and the status of the SSC report. This is the Department talking.

Turn to page four of this document, and I will refer you to paragraph three which starts: "Italy is fully committed"—do you have it, Mr. Gibbs?

Mr. GIBBS. Yes.

Mr. BOEHLERT. Italy is fully committed to the continuation of CERN and the LHC program and currently claims not to have the means within its present science budget to participate in the construction of the SSC. On page five, the paragraph on France begins: "France is committed to the continuation of CERN and the LHC." Germany is described in the next to the last sentence of that section, "Under these circumstances, the Germans indicate that they will not have funds to help in the construction of the SSC."

Now when you go to the United Kingdom description, that says that the British HEP budget is committed for the next 10 years. Finally on page six the Department concludes that the Europeans have a large investment in and a strong commitment to CERN. "The future health of CERN depends on its having a major new facility around the end of the decade. At present, the LHC is the only viable candidate. We are told that such a project will more than saturate the present European high energy physics budgets and not allow European participation in the construction of the SSC. Moreover, the decision to provide additional funding specifically for the SSC would require a major policy decision at the highest levels by one or more of the European governments. If the LHC were to default for some reason and be replaced by a less expensive new project, some funding for the SSC might become available, possibly for SSC construction but more likely in the form of increased participation in the SSC detector. Such a negative decision on the LHC is not likely, however, for at least 3 or 4 years."

There is no money to be had in Europe, is there?

Mr. CIPRIANO. Our assessment is, I think, accurately reflected at that time, as depicted here. We do not see a substantial participation by most of the countries that are outlined here with their commitment to CERN. That is accurate and remains our assessment.

There are certainly some strong interests on almost each of these countries in terms of the detector collaborations and contributions and participation in the detectors, but from a financial and overall economic constraint point of view, we do not see major participation from these countries.

That is not to say that we are not looking at those countries. In fact, I want Tom to comment in a minute. We are pursuing some things with some of these countries. For example, France——

Mr. BOEHLERT. It sounds to me like we're operating on wishes and prayers. Brother Tom, I would like to hear from you.

Mr. CIPRIANO. I think we'd better do that in closed session. We have some fairly sensitive discussions going on with some of these countries that we prefer not to discuss.

Mr. BOEHLERT. Well, we've heard a lot about sensitive discussions with foreign countries about obligations, let alone areas of interest. We've had difficulties getting them to fulfill obligations. In this little matter called Desert Storm that we participated in, there were a lot of pledges made. I consider those obligations. Boy, it's

like pulling teeth to get them to give money to fulfill their obligations.

In this we have had casual expressions of interest because we've been hearing on our full committee for a couple of years now that there is a lot of interest and a lot of enthusiasm all around the world in participating in this project. There are a lot of words, but no action.

What about India? Let me go to India, if I may. You've been claiming that the Indians will give $50 million in-kind to the SSC. That's not a binding commitment, is it yet?

Mr. GIBBS. There is an agreement under an existing science and technology initiative that is I believe about 2 years old. We can provide that for you for the record if you don't already have it.

[The information follows:]

Committee: Science, Space, and Technology
Subcommittee: Investigations and Oversight
Date: May 9, 1991
Witness: Garry W. Gibbs
Page: 138
Line: 3311

Insert for the Record

EXTENSION OF THE SCIENCE AND TECHNOLOGY INITIATIVE BETWEEN INDIA AND THE UNITED STATES OF AMERICA

1] The United States and India value highly their mutually beneficial cooperation in science and technology and recognize the key role of scientific research in economic development and the many benefits to be derived therefrom. The Gandhi-Reagan Science and Technology Initiative (STI) exemplifies the sophistication and breadth of that collaboration. From its 1983 beginning, the two sides selected projects in forefront areas of research. Under STI, both countries participate as scientific equals and make investments of resources for benefit of both our peoples and the rest of the world, with the expectation of tangible results within short and long time periods. The January 1983 report of the Joint Indo-US Senior Scientists Panel, accepted by the two Governments, describes the basic features of Gandhi-Reagan S&T Initiative of these basic features of STI in the January 1983 Joint Report, some are:

"...the establishment of scientific and technological collaborations between equal partners who can bring, with considerable advantage to both, highly complementary data, opportunities and experience to bear on problems of mutual interests", and

"...both the challenge and the opportunity to establish new activities that will not only advance world frontiers in science and technology but also provide very direct benefits-- in both short and long term-- to both our peoples and to the rest of the world";

and with this potential, from an S&T collaboration between equal partners, of direct benefits to both our peoples and of other countries, the two governments reaffirm here the January 1983 Joint Report's description of STI's basic features, methodology for establishing mutuality of interest, and its reciprocal executive arrangements.

2] Bearing out the hopes of the two leaders, the past five years have seen important successes in many aspects of the STI program areas of health, agriculture, biomass, monsoon, and solid state science and engineering. The results of studies on the role of Vitamin A deficiency in childhood blindness are influencing oral rehydration therapy worldwide. Research on filariasis, and leprosy have resulted in diagnostic advances for earlier detection and treatment. Research on metal extraction and recovery through bacterial leaching has suggested ways to genetically engineer superior bacterial strains. In the nitrogen fertilizer program, scientists have developed a more efficient strain of water fern as a low cost nitrogen supplier and fertilizer for rice. Beyond these impressive research results, the STI has within itself the potential to stimulate collaboration between US and Indian scientists in a broad range of fields.

3] Based on joint recommendations of December 1987 and subsequent discussions within and between the two Governments, the current studies given in Annexure-1 will be continued, and the new project-topics given in Annexure-2 will be initiated. The

new project-topics include a number of new proposals under STI. The two governments agree with the distinguished scientists that STI's methodology for identifying and launching new projects should be retained and developed as the enduring legacy of the Gandhi-Reagan STI comprising: drawing upon the experience of the distinguished scientists to jointly identify broad areas of opportunity for bilateral research; bringing together leading scientists from both countries in the identified areas to explore project concepts against mutually identified topics, or to define specific collaborative projects and research protocols for the mutually accepted project concepts; nodal executive agencies, i.e., NSF and DST, that provide centralized communication, expedite approvals and rapidly launch these projects; an independent overview process involving joint meetings of the two countries representatives which provides feedback on the quality, needs and opportunities that are vital to the future of the initiative.

4] Both governments reaffirm their commitment as in 1983 that:

"Considering the importance of intensive pursuit of the programs proposed herein, and recognizing that national interests may restrict access to certain areas, facilities and information, each country will provide high level mechanisms involving sufficient authority to ensure rapid response to request for access to research data, to research facilities and for visits to restricted areas after due evaluation of the potential benefits involved."

It has been the practice under STI that mutual approval of health projects, or changes thereof, involving research on human subjects in respective countries has been subject to ethical clearances and regulation by the authorities of the

concerned country; this practice will continue. In general, mutual approval on any research project is subject to the laws and regulations of the respective countries.

Moreover, the two governments recognize the importance of those factors that originally attracted the best scientists to the STI, including the support, financial and otherwise, that goes with such an initiative to render it effective. Specifically each Government commits to providing strongest possible project support through mechanisms appropriate to the respective countries; such support will serve to energize and revitalize STI's lustre. To this end, appropriate arrangements on administrative issues will be developed and signed separately in the near future.

Further, both governments will take steps to broaden the participation to include researchers and institutions from as many of their respective academic, research and development communities as feasible. Particular emphasis will be given to enhancing exchange opportunities for promising younger scientists.

5) Anticipating potential achievements from such joint research, India and the United States agree to consider the question of providing for protection and allocation on a mutually agreeable basis of any Intellectual Property Rights arising out of the STI programs. To this end, the two governments will undertake bilateral discussions with appropriate representatives.

6) President Reagan and Prime Minister-Gandhi, during their meeting of October 20, 1987 noted the key role of science and technology in enhancing Indo-US bilateral relations and the achievements and potential of their Science & Technology Initiative. The President and the Prime Minister thus directed the undersigned to

extend the Gandhi-Reagan Science and Technology Initiative for an additional three year period beginning in October 1988.

For the Government of
the United States of America
William R. Graham
Science Advisor the U.S.
President

date: 5 October 1988
place: New Delhi

For the Government of India

MR Narayanan
Minister of State for Science
and Technology

Annexure-1

STI Projects to Continue

AGRICULTURE

1. Rhizobium Strain Improvement, Maintenance of Rhizobium Germ-Plasm Bank and Improvement of Carrier and Inoculation Techniques.
2. Synergistic Effects of VA-mycorrhiza with Rhizobia to Improve Nodulation and Nitrogen Content of Legumes.
3. Biological Nitrogen Fixation by Blue-Green Algae and Azolla.
4. Molecular Biology of Symbiotic and Free Living Nitrogen Fixation.
5. Nitrogen Fertilizer Efficiency

BIOMASS

- Species selection, testing and improvement
- Cultural system for short rotation forestry and agroforestry
- Application of tissue culture as a biotechnological tool in the efficient propagation of woody species.

additional activities:

- Silvi Biological Nitrogen Fixation
- Germ Plasm Bank Establishment
- Semi-Automated Nursery Technology for Multiplication of Improved Varieties through seeds, clones, and tissue-raised elites for distribution to satellite nurseries.

A workshop may be held at mutually convenient time to result in the development of specific STI projects.

ENGINEERING & SOLID STATE SCIENCES

MINERAL ENGINEERING

1. Development of Special Strain for Bacterial Leaching. (subject to the successful outcome of scientific peer review)
2. Development of New Specific Reagent Combinations for Beneficiation of (i) Alumina Rich Iron Ores; (ii) Phosphate Slimes, and (iii) Partially Oxidized Sulphide Ores.

PHOTO VOLTAIC MATERIALS

1. Preparation of Amorphous Silicon and its Alloys by Different Methods and Studies of the Physics of the Materials. (up to September 1990)

HEALTH

1. Detection of Infected Mosquitoes using the Two-Site Immuno-RadioMetric Assay. (up to September 1989 subject to identification of a US collaborator)
2. Development of an Anti-Fertility Vaccine based on Immunization against LHRH in the Male.

3. Feasibility of Development OPSH as a Contraceptive Vaccine for use by Man.
4. Effect of Hetero-Immunization using Porcine Zona Pellucida Antigens.
5. Case Control Study of Senile Cataract. (up to March 1989 to permit completion)
6. Laboratory & Clinical Studies of Eales' Disease.
7. The role of Dendritic Cells in the Antigen Induced in Vitro Lymphoproliferative Responses in Leprosy.
8. Development of Leprae Specific Human T-Cell Clones.

MONSOON

INTER ANNUAL VARIABILITY (program 2)

1. Study of Subseasonal (30-50 day) and Inter Annual Variability of the Monsoon. (on-going; terminate on completion)
2. 40-60 day Oscillations: Theoretical Studies of the Interaction with the 10-20 day cycle. (on-going; terminate on completion)
3. Extra Tropical Interactions with Monsoon Northern Hemisphere. (jointly approved; terminate on completion; data related)
4. Simulation Studies with GCM to Co-Relate Monsoon Activity with Global Parameters such as Snow Cover. (on-going; terminate on completion)
5. To analyze GCM experiments for Studying the Influence of Northern Hemi-Spherical Surface Air Temperature Anomalies on Monsoon. (on-going; terminate on completion)
6. Modelling of Land Surface Processes. (jointly approved; terminate on completion; data related)

7. Modelling of Land Surface Processes with a BioSphere Model. (on-going; terminate on completion)
8. Indian Rainfall Fluctuations in Relation to ENSO. (jointly approved; terminate on completion; data related)
9. 40-60 day oscillation: Interaction with Intra-Seasonal & Seasonal Cycles. (jointly approved; terminate on completion; data related)
10. Preparation and Analysis of 850 & 200mb Global Tropical Belt Wind Charts. (jointly approved; terminate on completion; data related)
11. Outgoing Long wave Radiation and Rainfall Derivation (A). (Ongoing; terminate on completion)
12. Out-going Long Wave Radiation and Precipitation Estimation from Satellite Data (B). (jointly approved; terminate on completion; data related)
13. 40-60 Day Oscillations based on Analysis of Satellite Data. (jointly approved; terminate on completion; data related).
14. Long Term Proxy Records for Monsoon. (on-going; terminate on completion)
15. Study of Decadal and Century Scale Monsoon Fluctuations through Pollen Analysis of Lake Sediments. (on-going; terminate on completion)

16. Project Based Data Requirement and Data Management. (jointly approved; terminate on completion; data related)

For the Government of the
United States of America
John H. Moore
Deputy Director
National Science Foundation

date: 5 October 1988
place: New Delhi

For the Government of India

Vasant Gowariker
Secretary
Dept. of Science & Technology

Annexure-2

New STI Topics

The STI Methodology on Establishing Mutuality of Interest in terms of Specific Projects/Programs will apply to the topics identified below. The projects/programs will be initiated as funding permits.

Agriculture

- x Basis of Drought Tolerance in Rain-Fed Crops
- x Plant-Factor in the Effectiveness of Nodulation Process with Rhizobium

Health

- x Leprosy and Tuberculosis
- x AIDS (HIV) and Tuberculosis
- x Non-Immunological Approaches in Fertility Regulation
- x Conjunctival-Impression Cytology for Diagnosis of Sub-Clinical Vitamin-A Deficiency.
- x Tuberculosis
  - xx the new programme scope covers:
    - o immunology & molecular biology of TB
    - o vaccine development
    - o diagnostic tests
    - o preventive therapy & treatment

Under the Indo-US S&T Sub-Commission a joint workshop has been held in Atlanta, USA (Sept 1988). The recommendations by this workshop may be examined under the aegis of STI to select some high quality proposals for focussed research under STI; the proposals mutually agreed to would be developed into specific projects using the STI methodology.

x Virus-Induced Neurological Disorders

xx the proposed scope covers:

- o human T-cell leukemia virus type-1 (HTLV-1) involvement in neurological disorders including tropical spastic paraparesis (TSP)
- o comparative studies to examine the hypothesis that the clinical manifestations of HTLV-1 infections vary geographically and that HTLV-1 may plan an etiological role in multiple sclerosis and other progressive nervous system diseases.

This study is included in the bilateral scope for mutual consideration -- specific Indian response would be available on identification of a suitable Indian investigator.

x Studies on Acquired Immune Deficiency Syndrome (AIDS)

xx this topic may be included in the bilateral scope; a specific project proposal needs to be developed under STI.

x Immunological Studies of Patients with Visceral Leishmaniasis and Post-Kala Azar Dermal Leishmaniasis.

xx this topic may be included in the bilateral scope; a specific project proposal needs to be developed under STI -- progress on this depends on joining of a suitable Indian Investigator at Patna.

Monsoon

x Indian Drought 1987

- o involves a well defined and focused case study of the factors contributing to the failure of the monsoon; the study would emphasize the interdependence of factors in all areas of the world on the weather and climate of each.
- o this project will be included under STI only after an exchange of notes between the National Science Foundation and the Department of Science and Technology to clarify perceptions on the project objectives, elements, and types of data required.

Superconducting Supercollider

x It is agreed to establish a small working group consisting of scientists from both countries to plan and make recommendations on the Superconducting Supercollider collaboration under STI; and it is agreed in-principle that:

- The potential collaboration possibilities are:
  - o Cooperation in the Overall System Design
  - o Design, Development & Production of Significant Subsystems/Components:
    - oo superconducting correction magnets
    - oo radio frequency & high vacuum components
- It would be necessary for the Indian team to make a lengthy visit to the central design group in US and participate in the ongoing work to become thoroughly familiar with the concept design of the system and its principal components, and the fabrication requirements of the subsystems or components.

- A period of 6-9 months would be appropriate for an informed discussion between the Indian team and the US central design group to define the specific collaboration possibilities.
- Through its manpower and hardware fabrication, India may contribute in kind to the extent of US $50 million over a period of ten years.
- U.S. Government has yet to commit funds on this project; progress will depend on this.

For the Government of the
United States of America
John H. Moore
Deputy Director
National Science Foundation

date: 5 October 1988
place: New Delhi

For the Government of India

Vasant Gowariker
Secretary
Dept. of Science & Technology

Mr. BOEHLERT. I have an interesting trip report filed by a Dr. Wilmot Hess. Let me read a portion of that, if I may. "A major interest of theirs"—talking about the Indians—"is to have their people involved in the design of the SSC and get familiar with how the U.S. does this sort of thing. The SSC laboratory has agreed to take eight of their scientists on to work at the lab. There was some concern about paying for this. Schwitters thought that there was to be a sharing of the cost of these people, but Inger said that they couldn't get foreign currency to help support them so Schwitters is paying the entire bill. Therefore, this does not constitute an Indian contribution to the SSC. They are paying for nothing for these people. Schwitters is simply hiring them."

Is that the Indian contribution, hiring foreign nationals?

Mr. GIBBS. Let me have Ed respond to that.

Mr. SISKIN. As the question came up earlier, I think I pointed out that we were paying for their expenses for living in the United States. We are not paying for their salaries.

Mr. BOEHLERT. But we're still paying. I mean, this is foreign participation. Supposing the Japanese want to participate in this matter, and supposing we could convince the French and the Germans that, "Don't look towards CERN, look toward the United States." Do we have the same sort of arrangement?

Mr. SISKIN. The written agreement we have with CERN is that for people——

Mr. BOEHLERT. No, to come here for SSC is what I'm talking about.

Mr. SISKIN. The written agreement we have with CERN is that for people we send there, they pay for the expenses, we pay for the salaries. For the people they send here, we pay for the expenses, they pay for the salaries. It is exactly consistent with what we are doing with the Indian government.

Mr. BOEHLERT. But the Congress keeps being told that we're going to have foreign participation, depending on where you studied mathematics, to the extent of $1.654 billion, or $1.654 plus $219 million. We keep being told about this foreign participation, but it seems to me that the foreign participation we have from the one country in question is costing us. Where is the contribution?

Mr. SISKIN. The contribution is that if I were to hire somebody and put them to work, I would be paying them a salary plus expenses. In the case of the Indian scientists, I am only paying their expenses. The difference is the contribution.

Mr. BOEHLERT. Boy, I could carry that through to some very interesting conclusions.

Mr. SISKIN. But again, Mr. Boehlert, I think we're talking about a very small part of the total differentiation of the Indian contribution. I expect that a significant amount will be involved in RF activities, which will be provided specifically, that would replace things that we would have to buy here.

Mr. BOEHLERT. Let's go to Korea. That's an interesting arrangement, incidentally, with India. But I find a lot of things here——

Mr. BARTON. Would the gentleman yield?

Mr. BOEHLERT. I would be glad to.

Mr. BARTON. I want to try to get a clarification.

Would you state that we are going to get $50 million worth of benefit from the Indian participation, that if we didn't have India we would have to spend $50 million of American dollars?

Mr. SISKIN. I would categorize that as close to $50 million.

Mr. BOEHLERT. How much of a margin of area—when you say close to something——

Mr. SISKIN. In the $40 million to $50 million range. The expenses going back and forth to inspect things in India would be more than inspecting something that we're building in California, so in fact that would reduce the net value of the contribution.

Mr. BOEHLERT. So you would allow for a 20 percent variable. That's a pretty good margin for error, isn't it?

Mr. SISKIN. It's the kind of contingency numbers that have been placed upon us in many areas.

Mr. BOEHLERT. But that's the problem with this whole thing. That's why I said what I said in response to my colleague, Mr. Hall's comment. Once again, I have no dispute that this is good science. I'm just concerned about placing it in the proper level on our agenda in terms of priority. There is an awful lot of loose arithmetic around here.

Mr. GIBBS. Mr. Boehlert, if I may, let me just comment that from the Department's point of view, we are very much looking at the net offsets to the TPC. We will be reporting to you on those as we move forward with the project. In the case like the Indian contribution, we will be reporting the net of that, that offsets work that would have been done and accomplished within the TPC.

Mr. BOEHLERT. The Department's own analysis of the foreign situation indicates that we will never reach the one-third non-Federal goal. That is very disturbing to me.

Mr. CIPRIANO. I think the message of the briefing was—and it was a White House briefing—was that the President was going to have to help us if we were to meet these foreign contribution objectives, and the President has held up his end of the deal. He has met with Japan and so forth.

Mr. BOEHLERT. Count me as a strong George Bush supporter. I was there in 1979, when everybody else told me a Governor from California looked promising. [Laughter.]

"This is the guy we ought to have there." Boy am I glad he's there.

Isn't it the Department's position that to the degree that countries participate at all, many of them will not do so until near the end of construction and that they will make cash contributions? That's what Secretary Moore suggested in his testimony before Senator Ford's committee. Isn't that so?

Mr. GIBBS. You're referring again—that reference was made earlier in a hearing. I would have to look at that testimony exactly to see the context of what it was that he was saying. We certainly, as a matter of planning and looking at when the contributions can be made and when they should be made. We have the baseline report out that shows when we need these contributions. The large contributions will be largely in-kind, and they will probably be occurring in the mid to later part of the life of the project. There still could be cash donations toward the end of the project. But I——

Mr. BOEHLERT. Let me ask you, when—I'm trying to describe this so you won't think it's pejorative—but when did the story line change? It seems to me that in the early presentations we were told—and the international participation, incidentally, was stressed very heavily—we were told that would have to come early because obviously if we wanted international partners to participate in this project, they wanted to have participation other than just shelling out the cash. They wanted to participate in the decisionmaking and building the type of facility that met their standards and needs as well as the type of facility that met our standards and needs.

It would lead me to conclude, because we have changed, my conclusion—and maybe I'm off base, I will concede that's a possibility—but it would lead me to conclude that we've tried very diligently—and I credit Secretary Moore for what he has done. He's been traveling a lot and talking to a lot of people. I have all the confidence in the world in the President. It sort of encouraged me when I saw him sitting there with the Prime Minister of Japan. I thought they would come out into the rose garden and say, "We got our first $1 billion."

But that hasn't come about. So it leads me to conclude that it is wishful thinking for us to think in terms of one-third non-Federal share of which a good share of that will be foreign participation. I wish you could give us some encouraging words.

Mr. GIBBS. Well, I think we are encouraged, as a Department, from the point of view of the activities that are underway, the trips that are planned, the interest we're seeing expressed by these countries, even in the case of the Soviet Union, where there are some worries—from an infrastructure and resource point of view—there were some worries and concerns. In addition to that, we have a number of inter-laboratory agreements that are underway.

The very nature of this process, though, is a formalized and government-to-government level kind of agreement. As you know, these take time. That's what we're reflecting as much in this report, that it's not something that is going to happen immediately or overnight, but it is going to take further work, a lot of effort, and it will take a year or two before we can start to see firm commitments that begin to move resources.

That's why the assessment, I believe, is made as to when those resources then flow into the project.

Mr. BOEHLERT. Well, let me ask you this last question. Would the Department support a bill that would withhold full authorization until 20 percent foreign participation is secured?

Mr. GIBBS. I don't. And my personal opinion would be that we would have a difficult time securing those commitments without showing that we're going ahead with this project.

Mr. BOEHLERT. So you're saying that no, the Department probably would not support----

Mr. GIBBS. I cannot speak for the Secretary on this, but we could----

Mr. BOEHLERT. This Department supported it last year.

Mr. GIBBS. I understand that.

Mr. BOEHLERT. Okay, Mr. Chairman.

Mr. Gibbs, let me read to you, and obviously you can see that we have done a good deal of preparation for this, so we are scripted because we were working long and hard on this.

Let me read the last paragraph on the last page of DOE's October report on the status of SSC. This is the last paragraph on the last page of the October report.

"The U.S. may therefore, with Texas support, need to carry most of the cost of constructing the SSC for several years. Significant foreign contributions may not be forthcoming through the mid-1990s."

Again, that fits with Secretary Moore's thinking that foreign contributions will come in the form of cash in the last couple of years in the project.

Now we have another chart, chart number three, if the staff will put that up. That's the one—DOE's official baseline cost schedule.

Mr. GIBBS. Okay.

Mr. BOEHLERT. Mr. Gibbs, I asked that this table be composed demonstrating the Department's reported cost schedule by funding source. Keep in mind what you said previously about Secretary Moore in talking about far away. The green represents projected Federal outlays. The blue represents projected outlays by Texas, and the red represents projected contributions by foreign sources. As is evident, DOE anticipates receiving approximately $20 million in foreign contributions in fiscal year 1992, $100 million in fiscal year 1993, $250 million in fiscal year 1994, $300 million in fiscal year 1995, for a total of $670 million by the middle of the 1990s.

What happens to the SSC schedule if the Department's analysis about the tardiness of foreign contributions and Mr. Moore's belief that we will see cash at the end of the project are correct? What happens if we don't receive contributions until after the mid-1990s? What happens if Secretary Moore is correct?

Mr. GIBBS. One of the key features that we have tried to emphasize with the cost report and the baseline is that it's a combination of when you complete it, the total dollars, and the funding profile. So if you do something that significantly distorts that profile from what is reflected there, that then could have an effect of adding cost, or time, both of which cost money.

Mr. BOEHLERT. Well, then, are you going to come back to us and say, "Gee, we're sorry it didn't work out the way we had hoped. You need to appropriate not just the amount represented in green, but also those represented in red"?

Mr. GIBBS. The projection I think that is reflected there is really in the 1994 time frame. We're looking for $100 million to $200 million. It looks like about $200 million in that time frame of foreign in 1994.

Mr. BOEHLERT. It's $670 million by the mid-1990s.

Mr. GIBBS. I'm just looking at it by year. I was trying to respond in terms of 1994 would be when we would see on the order of $200 million in foreign contributions in that profile, and then a like number of $8.25 billion or so, it appears $300 million in 1995. So it's really the 1994/1995 time frame that the significant contributions are reflected there.

Mr. CIPRIANO. I think the statement that the deputy secretary has made is that when it becomes clear to us that we cannot honor

this commitment, and we are not going to be able to get the foreign countries—if that happens, then we will come back and consult with Congress about whether to—

Mr. BOEHLERT. You're going to come back with hands out. Isn't two unacceptable alternatives either that you appropriate more money, or we slip the schedule. What is the cost of slipping the schedule, by, say, a year?

Mr. CIPRIANO. In total project costs, I think it costs about $400 million.

Mr. BOEHLERT. That's more than $1 million a day.

Mr. CIPRIANO. Yes.

Mr. BOEHLERT. We have some problems.

Mr. BARTON. That's the reason the ICE estimate is larger is because they make the point you just made that it perhaps may be slipped. That's where their estimate comes in higher.

Mr. WOLPE. When I hear this discussion of foreign contributions, I am reminded of the line from "Field of Dreams"—"If you build it, they will come". [Laughter.]

Mr. WOLPE. This is really one of the most skeptical—dubious kinds of propositions that I've seen for a long time.

I want to shift at this point to the magnet issue. I ask unanimous consent to introduce into the record a February 1, 1991 letter from the associate director of Magnet program, to Dr. Dennis Theriot at Fermi Lab.

[The referenced letter follows:]

Superconducting Super Collider
Laboratory

2550 Beckleymeade Avenue
Suite 240, MS-1000
Dallas, TX 75237-3946
(214) 708-3000 • FAX (214) 708-4999

Magnet Systems Division
Associate Director's Office

February 1, 1991

Dr. Dennis Theriot
Fermi National Laboratory
P.O. Box 500
Batavia IL 60510

FILE COPY

Dear Dr. Theriot:

Recent problems experienced by Fermilab with the assembly of long SSC 40mm dipoles raise serious concerns that our joint effort may not be taking all action necessary to properly support the SSC magnet production program.

Based on joint FNAL-SSCL reviews, it appears that the following systemic weaknesses need to be addressed adequately if we are to have confidence in the success of our program:

a) quality control is not sufficiently effective, partially because of its organizational reporting chain. Specifically, the quality assurance effort cannot report to production management and still be effective;

b) production workers are not adequately trained as active participants in the quality process and in the need for verbatim compliance with assembly instructions (travellers);

c) engineering personnel are not properly involved in the disposition of discrepancies and assembly errors; therefore, the engineering personnel are losing their necessary control of and responsibility for the process;

d) weaknesses in cleanliness, housekeeping, access control, and space utilizations have not yet been adequately improved.

These weaknesses continue to have a negative impact on the quality of the product.

Because of the critical nature of the 50mm magnets at FNAL and the timely need for demonstrable success, it is necessary that we delay any assembly of 50mm magnets until improvements in the above areas can be effected. I would appreciate receiving your corrective action plan by 8 February 1991.

Prior to actual 50mm assembly operations, a production readiness review will be conducted. This review, chaired by my office, will include personnel from SSCL, FNAL, BNL, the magnet subcontractors, and DOE. The objective of this review will be to establish that all actions

[redacted]

necessary to successfully assemble 50mm long magnets at FNAL have been implemented. To assist FNAL, we are placing SSCL on-site management in your facility, starting 5 February, with authority over and responsibility for all SSCL magnet activities.

Subcontractor assembly of the 50mm magnets at FNAL is absolutely critical to the success of the string test and hence the SSCL. I am confident that FNAL working with SSCL management will take whatever actions are necessary to insure success.

Sincerely,

Dr. Thomas O. Bush
Associate Director

cc: Central Files (MS-2042)
E. Siskin (MS-1070)

AFD: Bush Storage/Theriot(L)2-1-91

Fermilab
P.O. Box 500 • Batavia, Illinois • 60510
708-840-3211 FTS 370-3211
Director's Office

February 8, 1991

Dr. Thomas O. Bush
Associate Director
Magnet Systems Division
Superconducting Supercollider Laboratory
2550 Beckleymeade Avenue
Dallas, Texas 75237

Dear Dr. Bush:

In response to your letter of February 1, 1991, we share your concerns over the problems experienced with the 40mm magnet fabrication. Let me enumerate some of the corrective actions that we have taken.

a) Floor Supervision

We had recognized a weakness in floor supervision and have replaced the production floor supervisor and added several key subordinates. From their past record of performance they are among the best supervision that is available at Fermilab. We have also disconnected building management responsibilities from the floor supervisor.

b) Tooling Design

A number of the problems that we have encountered have been eliminated through design of the 50mm tooling. The most recent example is the autopsy of DDO303 which indicated that our collaring press over compressed the coils at the ends. This over pressure caused the parting plane short. We are confident that our upgraded collaring press will eliminate this problem.

c) Space Needs and Housekeeping

We have been working for some time to obtain additional space. We are now moving inventory of parts from the high bay floor into the warehouse space for which you were instrumental in obtaining the lease. The laboratory has assigned a space on site to which the receiving incoming inspection and a portion of the inventory storage will be relocated. This is presently being done at a very accelerated rate. As you know there are a number of other housekeeping matters that have been addressed and are in progress.

d) Traveler Development

We have recently made a personnel change and put the person most experienced in traveler development at Fermilab in charge of the traveler development for the 50mm fabrication.

e) Training

We will ensure that all supervisors in the production area will be trained on the contents of each traveler for which they will be responsible. In this training, the need for verbatim compliance will be stressed. All production workers who will be responsible for signing completed activities will receive certified training on the contents of the traveler. Procedure write ups of activities not specifically detailed in the traveler will also be included in the training.

f) Quality Assurance

We suggest that independence be provided by SSCL QA personnel signing off at critical stages in the magnet fabrication. The traveler will distinguish between assembly instructions and quality control steps. Any subset of these QC steps which would involve considerable expense to rework would require SSCL approval. By this approval, SSCL would be assured of independence and this process would not require a change in FNAL QA responsibilities.

g) Involvement of Engineering Personnel

Engineering personnel have been fully involved in and responsible for resolving major assembly problems and discrepancies, but because key personnel have many responsibilities, some of the more minor discrepancies may not have been covered as well. We have instituted, in cooperation with the SSCL MSD QA group, a more formal system for reporting manufacturing discrepancies. Production personnel who find a discrepancy initiate a report and attempt to state the cause. These reports are forwarded to engineering personnel for evaluation and determination of corrective action, and the report is included in the traveler. Copies of the discrepancy reports will be given to SSCL for information and trend analysis. By this system, we will ensure that engineering personnel are adequately informed of and involved in the disposition of minor as well as major assembly problems. We also welcome your offer to station at Fermilab several SSCL engineers experienced in superconducting magnet manufacturing. With additional knowledgeable personnel present, more engineering expertise can be brought to bear on each problem.

[redacted]

We also welcome your full time on site representative. This will certainly enhance our communication and effort to optimize the chances of success of our joint activity.

We fully recognize the critical nature of the industrial subcontractor assembly of 50mm CDM's at FNAL. You have our full cooperation to make this endeavor a success.

Sincerely yours,

Dennis Theriot, Associate
Director for Technology

DT/GP:ms

cc: [redacted]
J. Peoples
K. Stanfield
R. Orr
P. Mantsch
G. Pewitt

Superconducting Super Collider Laboratory

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(214) 708-2032 FAX (214) 708-0003

Magnet Systems Division
Associate Director's Office

February 22, 1991

Dr. Dennis Theriot
Fermi National Accelerator Laboratory
P.O. Box 500
Batavia IL 60510

Dear Dr. Theriot:

As discussed in my letter of February 1, 1991, to you, a Production Readiness Review will be conducted prior to 50mm magnet assembly operations. The objective of the review will be to ensure that all necessary actions have been implemented to provide for successful assembly of 50mm long magnets.

The readiness review will be conducted at Fermilab beginning on March 25, 1991. It will be conducted by my staff supported by experienced personnel from SSC, other labs, DOE, and contractors.

While it is recognized that there are numerous and difficult problems for the Fermilab staff to still resolve, we believe that the readiness review items focus on areas that are most vital to success of the long magnet program. To this end I have enclosed an outline of the items we will review. I will discuss detailed arrangements with you about two weeks before the review. We ask that you provide wholehearted support to this most critical task.

Sincerely,

Dr. Thomas O. Bush
Associate Director

Enclosure

cc: E. Siskin (MS-1070)

AFD: MAK Author/Theriot(L)2-22-91

Production Readiness Review

General:

All items described in the letter from D. Theriot to T. Bush dated February 8, 1991, must be complied with including the following specific items, and a plan to accommodate the assembly of magnets by General Dynamics (GD) must be agreed to by all parties.

(A) Documentation

1. The Engineering Change Proposal process exists and is functioning between manufacturing, engineering, and QA.

2. Drawings are controlled. Drawing revision release schedule supports need dates, and risks involved with incomplete release are judged to be minimal.

3. Travellers for coil winding and curing are approved, issued, and controlled. A method for timely update of travellers is functioning. An acceptable plan for the remaining travellers is in place.

4. Design reviews are complete and action items have been resolved.

5. Problem reports and corrective actions are adequate.

(B) Housekeeping

6. FNAL cleanliness plan is fully implemented and housekeeping is in order.

   (a) Areas 1 through 4 clean with sealed floors.

   (b) Access and traffic flow controlled.

   (c) All facilities work complete.

(C) Organization and Training

7. Quality Assurance System has integrity.

8. Overall management organization and approach are adequate.

9. Numbers of prpduction workers and supervisors are satisfactory.

10. Experience level of production workers is satisfactorily balanced with supervision.

11. Training is adequate.

12. Lines of authority, responsibilities, and decision levels are adequate. Floor support plan has been developed and commitments of responsible engineers secured.

13. Organization is effective for managing Suppliers and Supplier schedules for material delivery are adequate for supporting production. Critical material schedules have been verified by visits to those Suppliers. Alternate sources have been identified where necessary.

(D) Schedule

14. Production schedule is accurately portrayed and achievable and a daily report system is in place.

15. No conflict in resources/scheduling between SSC production and Tevatron production such that SSC production and testing have highest priority through first seven magnets or until five magnets assembled by GD have been successfully tested.

16. Schedule for modification of test stands is adequate.

(E) Hardware

17. Inspection/test equipment calibration is current.

18. Tooling is complete and has been proofed or a plan is in place.

Mr. WOLPE. In the letter the associate director states, "Recent problems experienced by Fermi Lab with the assembly of long SSC 40 millimeter dipoles raise serious concerns that our joint effort may not be taking all action necessary to properly support the SSC magnet production program."

He cites the following problems: insufficient quality control; engineering personnel not properly involved in resolving discrepancies and assembly errors; and weakness in cleanliness and housekeeping. He states, "These weaknesses continue to have a negative impact on the quality of the product."

As a result, assembly of the 50 millimeter dipoles was suspended until corrections were made, a readiness review was scheduled, and SSC lab management was placed in the facility.

Mr. Gibbs or Mr. Cipriano, would you care to provide any details on that.

Mr. GIBBS. Dr. Bush is the best person to answer that.

Mr. WOLPE. Dr. Bush?

Dr. BUSH. Well, the letter I wrote, so I don't have any problem with that. It turns out that those issues have been cleaned up very well by Fermi Lab with some minor help by us. They are now winding 50 millimeter magnets. We have General Dynamics up there on the schedule we originally put together. We should be testing magnets sometime in September—the first one—and we'll follow that with the other 10 or 12 I have programmed up there.

Mr. WOLPE. I first want to commend you for the action that was taken to address the problems. The significance of this issue seems to me to be a reminder of the kinds of problems that can crop up and of the reasons for our concern with respect to the kind of schedule that has been advanced here.

As a result of the situation at Fermi, did the lab establish a program at Brookhaven National Lab for industry assembly of magnets that can be used in the string test?

Dr. BUSH. The lab followed by the program at Brookhaven about a year or a year and a half before that. We actually increased the number of magnets at Brookhaven before we issued their contract, so that we would have been in September of 1990, I guess.

Mr. WOLPE. But is it not correct that the magnets that were contemplated to be built at Brookhaven at that point, in the original formulation were not the magnets for the string test?

Dr. BUSH. And they're still not. The magnets for the string test are magnets from Fermi Lab.

Mr. SISKIN. Mr. Chairman, I made that decision and the performance that was talked about in that letter was not a consideration in my decision to go ahead and strengthen the Brookhaven program. It was a number of other factors, not the least of which was to increase the competitive position that GAO talked about earlier today.

With respect to Dr. Bush's letter to Dr. Theriot, we came on very, very strong on those issues. In fact, I followed it up with discussions with the lab director at Fermi Lab on the basis that is a complex program and we're going to look for standards of quality and workmanship that won't permit any discretion.

So regardless of how those letters are interpreted, anytime there is any strain from the straight and narrow on their performance, we're going to come on very strong, now and in the future.

Mr. WOLPE. Again, I want to commend you for that. I have no quarrel with the response. But I think it's important to understand the problem that solicited the response.

I would like to read a memo that Mr. Bush wrote on February 1st. It reads: "Due to problems at Fermi in preparing for the 50 millimeter program, we shall establish a back-up program for industry assembly of ASST magnets at Brookhaven National Lab."

I have the letter here. I'm sure you're familiar with the memorandum.

It's clear as a bell, it seems to me, that the problems at Fermi were the reason for establishing the program to build ASST magnets at Brookhaven. I don't see how it can be any clearer than that.

Dr. BUSH. I don't understand what you said. I apologize. Maybe I wasn't listening well.

Mr. WOLPE. Let me just read you——

Dr. BUSH. I heard that. Did you have a question with respect to that. I apologize. I just didn't understand.

Mr. WOLPE. This seems to suggest that it was in fact the problems at Fermi that led to a decision to establish a back-up program for industry assembly of ASST magnets at Brookhaven.

Dr. BUSH. That is correct in——

Mr. WOLPE. I say that because a moment ago you tried to suggest that there was no relationship between the work that was going on at Brookhaven and the problems at Fermi.

Dr. BUSH. We established the Brookhaven before we had any problems at Fermi Lab. Then——

Mr. WOLPE. Now the program was shifted to some degree.

Dr. BUSH. If I may finish——

Mr. WOLPE. I'm sorry. Go ahead.

Dr. BUSH. We established the program at Brookhaven before we had any problems at Fermi Lab. The number of magnets at Brookhaven were increased, we had some things we wanted to test, we wanted to actually increase the length of the string test later on in the program, so we needed additional magnets.

Mr. Siskin, when he made the decision that he just told you about, and told me to go do that, I took advantage of that particular situation, I took some steps to ensure that those magnets at Brookhaven, if we needed them, could be used as backup magnets.

Mr. WOLPE. That's right. I never said that there was not an earlier decision to use Brookhaven to do work on magnets. The assertion that seemed to emerge from your own documentation was that to some extent the direction of work at Brookhaven was shifted in response to the Fermi problem.

Dr. BUSH. No, I wouldn't say the direction of the work was shifted. The decision was made to allow Westinghouse to go in there.

Mr. WOLPE. It was decided that additional work be done.

Dr. BUSH. Yes.

Mr. BARTON. Would the chairman agree that that is a prudent business decision, and it would apparently advance probably the success of the magnet program?

Mr. WOLPE. I want to repeat that I am not quarrelling with the prudence of the decisions that are being made. I am trying to establish—to clarify precisely the nature of the problems that were created that led to these management decisions that had to be made. Then secondly that there are certain cost implications for some of those decisions that were made.

I would like to ask unanimous consent at this point to introduce a February 4, 1991 SSC lab memo.

[The referenced memo follows:]

Superconducting Super Collider Laboratory
2550 Beckleymeade Avenue
Dallas, Texas 75237-3946

Magnet Systems Division
Dipole (CDM) Product Manager
Suite 240 I MS/1000
(214) 708-2188 Fax (214) 708-0003

MEMORANDUM

To: **Doug Fisher**

From: **Herb Trenham**

Date: **4 February 1991**

Subject: **Industry Assembly at BNL**

Reference: T. Bush memorandum, *ASST Magnet Assembly*, of February 1, 1991 (See Attached)

Please include in the FY 91 budget now in process an amount of $2,000K to cover industry assembly of magnets at Brookhaven, in addition to FNAL. This is a new item not within scope of the current CDM SOW and therefore not quoted by the subcontractors. Likewise it has not been included within the BCE or previous budgets.

This number is based on estimates by GD and WEC to conduct assembly at FNAL and is factored to consider the reduced number of magnets as well as the number of months of FY91 in question.

HDT/hdt

cc: T. Bush
R. Coombes
R. Fischer
T. Jones

Mr. WOLPE. It points out that the industry assembly of Brookhaven was not anticipated and will require an additional $2 million.

Mr. Gibbs, I want to make sure you have that exhibit.

This is a memorandum to Doug Fisher from Herb Trendon dated the 4th of February.

Dr. Bush. That's mine. Those people work for me.

Mr. WOLPE. I'm sorry.

Dr. Bush. Yes.

Mr. WOLPE. In partial response to questions the subcommittee submitted to DOE, the Department states that an approved contingency fund withdrawal of $4.5 million was made in order to build five magnets at Brookhaven so there would be an additional source of magnets to ensure schedules are met. Is this cost related to the incident we have just discussed?

Dr. Bush. I apologize again. I wasn't listening. I was reading the memo.

Mr. WOLPE. Sure.

Dr. Bush. I'm not doing a very good job for you, but that's what I was doing.

Mr. WOLPE. That's fine. Let me just repeat.

Dr. Bush. Sure.

Mr. WOLPE. The Department has stated in response to earlier questions we submitted to them that an approved contingency fund withdrawal of $4.5 million was made in order to build five magnets at Brookhaven so there would be an additional source of magnets to ensure that schedules are met.

Is this cost related to the incident that we have just discussed?

Dr. Bush. Yes, it is. The cost was due to the decision we made in September, yes.

Mr. WOLPE. So is the total cost, then, of this incident $2 million, as in the memorandum of Mr. Fisher, or $4.5 million, as indicated in the DOE response to us with respect to the contingency fund withdrawal.

Dr. Bush. No, the total cost would be the $2 million plus the $4.5 million.

Mr. WOLPE. So the total cost is $6.5 million. Okay, $2 million from the budget, $4.5 from the contingency fund.

Are there any other costs that have resulted or will result from this incident?

Dr. Bush. Off the top of my head, none that I'm aware of. I think we included them all in that particular thing and there may have some—no, I believe that's it.

There will be some additional costs because I sent a couple of other people up there to do some magnet testing, recent travel costs, and things like that, but I'm not aware of anything else.

Mr. WOLPE. The high energy booster will be the injector for the protons into the super collider. It has a proposed energy of 2 trillion electron volts, higher energy than any other proton accelerator in the world, and an accelerator this size has never been built before. Is that correct?

Dr. Bush. That's correct.

Mr. WOLPE. Though it is dwarfed by the SSC main ring, the HEB is itself a unique instrument with unique operating requirements,

yet the development on the HEB has been delayed several times. Is that not correct?

Dr. Bush. The development of the HEB magnets is actually underway.

Mr. WOLPE. But it has been delayed several times.

Dr. Bush. I guess so. I don't really recall it being delayed. It was started when we said we were going to start it. I'm not sure that that's a delay.

Mr. WOLPE. We'll come back to that question later.

Dr. Bush. Okay.

Mr. WOLPE. We're told that the design of the magnets for the HEB is proposed to be similar to the SSC magnets, including an aperture of 5 centimeters.

Dr. Bush. Yes.

Mr. WOLPE. Yet these magnets have different operating characteristics. Is that correct?

Dr. Bush. That's correct. They do, yes.

Mr. WOLPE. One of these differences is the bipolar operation which the ERC called Terra Incognito. DOE recognized the uncertainty and in a May 1990 report, the acting director of Office of Energy Research said, "Polarity reversal tests need to be done for HEB magnets. Nothing has been scheduled as of yet."

Then in an October 1990 monthly status report, the SSC lab said, "Plans and preparations to carry out bipolar magnet testing at Fermi Lab this winter are underway."

Finally, a January 1991 report from the acting director of the Office of Energy Research stated, "The high energy booster bipolar magnet tests at Fermi Lab have been deferred until the summer of 1991 in order to concentrate on the tooling and assembling of dipole to be used in the accelerator string test."

So the question is, Why has the research on an important component been repeatedly delayed in this way?

Dr. Bush. First of all, the amount of time we have in the program to do that we think is consistent with when we're going to make those tests. The other thing is that we want to make those tests on a 50 millimeter aperture magnet. What we wanted to use was one of the model magnets that we had in the dipole program, the collider dipole program at Fermi Lab. We also wanted to do that with some things that we had built and designed in KEK with several different kinds of superconducting wire. It took us time to get the wire for the Japanese part of the program together, so we have that program off and running now. And we have the test scheduled at the Fermi Lab here in a few months.

Mr. WOLPE. When is this issue now scheduled to be resolved?

Dr. BUSH. I wouldn't call it resolving an issue, it's just the first step in a lot of tests that will be done. I think it's sometime in the next few months. I don't recall or know the exact date. I can get it for you.

[The information follows:]

Initial SSC bipolar magnet testing results at Fermi National Accelerator Laboratory (Fermilab) were published in May 1991. SSC Laboratory analysis and test results showed very good correlation with no surprises. The magnets work as expected. Additional work is ongoing at Fermilab with the next phase to be completed at KEK, a high energy physics laboratory in Japan, by September 1991. At Fermilab

most future magnets will include bipolar tests in the series of various tests conducted.

Mr. WOLPE. All right.

A technical recommendation on the 5 or 6 centimeter HEB magnet alternative was scheduled for May 1, 1991.

Dr. BUSH. Right.

Mr. WOLPE. Was that deadline met?

Dr. BUSH. That deadline was essentially met. The reason—that did not require that we had the data from this particular test to do that particular recommendation.

Mr. WOLPE. Why did you insert the word essentially, then?

Dr. BUSH. Probably because I said too many things. [Laughter.]

Mr. WOLPE. Was it met? Were there parts of it that were not met and other parts that were?

Dr. BUSH. It is met. I have an HEB magnet specification that is being used right now.

Mr. WOLPE. According to a November 1990 monthly SSC report, work is continuing on the examination of HEB options, with primary emphasis in increasing the magnet aperture from 5 to 6 centimeters. This report also states that the present 5 centimeter magnet does not have a sufficiently large dynamic aperture at injection to ensure successful operation.

Has the final decision been made on the size of the aperture? If not, when will that be made?

Dr. BUSH. I believe it's done.

Mr. WOLPE. Wel——

Dr. BUSH. The 29th of April. Is that what it was?

Mr. WOLPE. So the final decision then is in fact——

Dr. BUSH. It's 5 centimeters.

Mr. BARTON. Could I ask if there were some cost considerations in that decision?

Dr. BUSH. Yes, there were quite a few cost considerations. Of course, again, if you need a larger aperture, you're going to have to use a lot of aperture, but a larger magnet sometimes can cost more. In this particular case, we found out that a 50 millimeter magnet was satisfactory, so we stuck with it, which is in fact what the baseline cost estimates are.

Mr. BARTON. Which will in fact save money, or prevent the expenditure of additional funds.

Dr. BUSH. That's correct. It keeps us within our costs.

Mr. WOLPE. Let me yield to Mr. Boehlert.

Mr. BOEHLERT. Let's discuss for a minute the magnet——

Mr. BARTON. Mr. Chairman, can I—just a point of clarification. Have we changed the procedure now? At one point in time I was getting to ask a round of questions in the same order, and I sense a ping-pong ball effect here. Will I at some point in time be allowed some more questions?

Mr. WOLPE. I will do my best to permit that.

As I indicated at the outset, the custom is that all subcommittee members can exhaust their questions first. I have tried to allow——

Mr. BARTON. You've been very generous. I'm just trying——

Mr. WOLPE. My problem and constraint, very frankly, is that we have to be out of this room by 2:00. We do have some material——

Mr. BARTON. Could I reserve at least 10 minutes at some point in time? You were giving me 5 minutes at——

Mr. WOLPE. I will guarantee you a 5 minute period, at least.

Mr. BARTON. I would hope that you would be generous in that definition of 5 minutes. [Laughter.]

Mr. BOEHLERT. Let's discuss the magnet acquisition strategy.

The SSC lab is using what is referred to as the leader-follower approach to contracting for the dipole magnets. That's correct, isn't it?

Dr. BUSH. Right.

Mr. BOEHLERT. And under this approach, the leader designs the magnets, and the production engineering and the follower watches. That's the essence of it, isn't it?

Dr. BUSH. The follower actually participates a little bit in the design activity through the same things that we participate in—critical design reviews, design reviews of specific components, those kinds of activities. When we get later in the program, the follower is actually required to set up and build what we call our pre-production magnets, which are the final part of the development program, the same number as the leader using the same tooling, which the laboratory itself will approve and then procure and place in both vendors.

Mr. BOEHLERT. The committees that reviewed the cost estimate were critical of this approach. The High Energy Physics Advisory Panel stated that the leader-follower approach limited competition because there is little incentive to the leader to design a good, cost-effective magnet because the only cost competition he faces with a follower is on his own design.

The Energy Research Review Committee stated that the leader-follower method limits competition and the opportunity for alternate verification methods. Your own magnet acquisition strategy of May 1990 argued for a single contractor for full scale engineering, development, and multiple contractors for production. What advantages to the leader-follower approach led you to ignore all this advice?

Dr. BUSH. Let me start out by saying that the—I think back in the back of the room both Westinghouse and GD are sitting there. You might ask them what they think. You might ask them a question about how much competition they think they're going to be able to see. I think they consider it to be fairly significant in the cost area. I don't think either Westinghouse or GD feel like there's an issue with respect to them being able to compete adequately and provide good magnets when the time comes.

Mr. BOEHLERT. Then you're confident that the follower is not too great a disadvantage.

How can you avoid collusion between the leader-follower that would attempt to carve off a billion dollar plus contract between them.

Dr. BUSH. It's awfully hard to tell you how I'm going to keep people from breaking the law—and that's what collusion is. I have to make some assumptions, of course, that the people will act in—shall we say—a legal fashion.

Mr. BOEHLERT. What's your leverage?

Dr. BUSH. My leverage? My leverage is in fact the winner of the contract has an opportunity to make an awful lot of money and the loser has an opportunity to lose an awful lot of money.

Mr. BOEHLERT. Well, we're going to have a lot of questions for the two companies, and the leverage we have is that both companies will be required to have the machining and production capacity to carry the whole contract.

Dr. BUSH. No, that's not true. Both companies have the capacity to carry through the low rate initial production, which is a very small rate. During that particular time, they are putting together a cost proposal for the remainder of the magnets. We will make a decision on who gets the remainder of the magnets, based on that cost proposal.

Mr. BOEHLERT. What do you do if there is a slippage in the schedule and you begin to fall behind in the magnets?

Dr. BUSH. That depends on what causes the slippage, that depends on how recoverable we are from it. For example, we've proposed—we've not proposed—we've told them that we will go to something that has a capacity of about 10 magnets a day. Right now, our schedules say we really only need eight. So we built in about a two per day rate cushion in the rate program right now.

Mr. CIPRIANO. If I may add, I have considerable experience with successful use of leader-follower type contracts where we have in fact had very good competition and in some cases even the follower won the competition—at least as many times as they didn't—so I have some confidence that this approach does work.

Mr. BOEHLERT. Let me ask you, If the leader-follower model for the dipole magnets is so advantageous, are you applying the same model to the quadrupole acquisition?

Dr. BUSH. No, and the situation is completely different. In the dipole magnet contract what we're talking about is $1 billion worth of magnet procurement and the investment we have to make to have both of them together is on the order of $100 million. So the leverage we have in that contract is enormous.

In the quadrupole contract, the delivery of the magnets is on the order of $90 million, the investment we would have to make is on the order of $50 million in order to achieve any cost savings there. There is essentially very little leverage.

So we don't use the same full-blown leader-follower program.

It turns out, however, that we have left ourselves an option to provide for a follower at a much lower level early in the program and keep the option alive so that if I want a tool, I'd follow up and use them, and I can do that when I choose to do it.

Mr. BOEHLERT. The string test is scheduled for next summer.

Dr. BUSH. Right.

Mr. BOEHLERT. It takes time to integrate contractors into this process. When will you make up your mind on that?

Dr. BUSH. The contractors are at Fermi Lab helping assemble magnets right now.

Mr. BOEHLERT. They are?

Dr. BUSH. Yes.

Mr. BOEHLERT. That's good news. That's welcome news. I'm glad to get some good news.

Dr. BUSH. On schedule.

Mr. BOEHLERT. If you decide to go with only one vendor, won't that absence of competition reduce the incentive to perform well?

Dr. BUSH. It could, depending on how they want to— whether or not they want to make money. It's my intent and my plan and our approach not to buy any magnet unless it works. Therefore, if they don't deliver magnets that work, they don't receive any money. Of course, the risk is that if they don't deliver me magnets that work, I have a schedule problem. So I have to continually work at that.

Those kinds of risks we believe right now, obviously, are low. Those kinds of risks if we think change as we get later into the program, we have left ourselves the option to do something about that. We could keep the follower tooled up with an industrial capacity. We could keep the follower building a few magnets—and that's probably the way we would approach it—if we think we have a higher risk, and therefore we need more insurance.

Mr. BOEHLERT. What's your criteria to determine if it works?

Dr. BUSH. The criteria to determine that it works is that I'm getting magnets on schedule, within costs, that do the job that I want them to do.

Mr. BOEHLERT. Where are you going to test them?

Dr. BUSH. Where am I going to test them? We're going to test every magnet at the industry's facility with my people there, not only observing, but in some cases doing some of the testing. We're also going to test components down at the subtier vendors. For example, if the super conductor plant, the plant that supplies all the other components that we need—mostly iron and steel—we're going to test them in process as they're built. We're not going to accept any magnet that comes from the vendor that hasn't met the acceptance testing that we've put in place, the requirements that we've put into place.

Then in addition to that, we're going to sample test on-site over the life of the program, and then we're also going to test every magnet once it's in the tunnel before we assemble it completely into the collider or the HEB.

Mr. BOEHLERT. But you haven't decided on the requirements for the acceptance test yet, have you?

Dr. BUSH. No, not in what I would call the final detail. I have acceptance testing that I use right now in all the hardware I've been buying for over 2 years to build magnets with, so I have an enormous amount of experience in that. Take superconducting cable, which is in all honesty the critical component, it's 27 percent of the price of the magnet. I have all those contracts in place, I have acceptance testing already set up for all that superconducting cable, and I have that stuff in place in a lead time of a year-and-a-half to two years before it's required in the production process to ensure that my most critical component is there and on time.

Mr. BOEHLERT. Hubble was tested like this and the system failed. What do you have for backup?

Dr. BUSH. Hubble wasn't tested like this. I don't know how Hubble was tested, per se.

Backup for what?

Mr. BOEHLERT. If everything fails, if everything goes to hell in a hand-basket.

Mr. BARTON. Let me ask a question. Is everything failing? Are your tests failures, or are your tests a success so far?

Dr. BUSH. the fact of the matter is that the magnets are doing very well, probably a lot better than many other things in the program. [Laughter.]

They work. They've been working for a couple of years. We think that the probability of having trouble in the magnet program is very low, compared to other parts of the program perhaps.

The backup if everything fails—that's a fascinating question. The backup if everything fails is to get everything back on track. That was the answer to a silly question like that.

Mr. BARTON. Congressmen don't ask silly questions, Mr. Bush.

Dr. BUSH. I apologize. [Laughter.]

Mr. WOLPE. I'm glad Mr. Barton put the record straight. [Laughter.]

I would like to turn at this point to some management questions.

URA, a consortium of universities, is the management and operating contractor for the SSC. Is URA a management and operating contractor at any other DOE facility?

Mr. GIBBS. Yes, they are. At Fermi Lab.

Mr. WOLPE. As the M&O contractor, URA, or the firms in subcontracts with them are responsible for all the design, construction, and operation of the facility. Is that correct?

Mr. GIBBS. I'm sorry. I didn't hear the question.

Mr. WOLPE. As the M&O contractor, URA, or the firms in subcontracts with them are responsible for all the design, construction, and operation of the facility. Is that correct?

Mr. GIBBS. Yes.

Mr. WOLPE. So there is no other prime contractor. DOE deals only directly with URA, and except for the funds the Government keeps, all the money for the project flows through it.

Mr. GIBBS. Yes.

Mr. WOLPE. So if DOE wants to have some control over this complex and costly project, they must have a strong handle on the activities of URA.

Mr. GIBBS. Yes, sir.

Mr. WOLPE. Let's look at the contract that defines the relationship between DOE and URA.

DOE contracts are governed by regulations known as the DEAR, DOE Acquisition Regulations. Is that correct?

Mr. GIBBS. Yes.

Mr. WOLPE. The DEAR, I guess is the acronym.

Mr. GIBBS. The dear in the fars.

Mr. WOLPE. Okay.

The DEAR are rather infamous for providing very little accountability. In the case of the DOE URA contract, it looks like the Department even watered down some key provisions of the DEAR.

I ask unanimous consent to introduce into the record a document entitled, "Request for Deviation Authority".

[The referenced publication follows:]

Request for Deviation Authority

Pursuant to Subpart 901.4 of the Department of Energy Acquisition Regulations (DEAR), the Procurement Executive, has authorized the following deviations to standard DEAR and FAR provisions:

A. Deviations and Rationale

1. DEAR 970.5204-13 Allowable Costs and Management Allowance (APR 1984)

Deviation

a. Paragraph (b) Fixed Fee was deleted and the following paragraph (b), Management Allowance was substituted therefore:

"(b) Management Allowance.

(1) In addition to the costs and expenses reimbursable under this article, DOE will pay the Contractor an allowance which shall be in lieu of all reimbursement for general corporate expenses and management services for the work under this contract. Said management allowance will include the fixed fees for the Contractor's two designated subcontractors as a line item. The amount of the allowance during the term of this contract shall be determined by written agreement of the parties, which need not be by formal supplement to the contract, subject to 2) below. As early as practicable each Government fiscal year, the Contractor shall provide to DOE a proposal for the allowance for that fiscal year. An audited report of expenditures for the previous fiscal year certified by independent auditors selected by the Contractor shall be provided to DOE as early as practical. The amount of the agreed allowance for any particular period shall be paid in equal monthly installments during the period and shall not be subject to redetermination except for an adjustment in the management allowance caused by an adjustment, if any, to either of the designated subcontractors' fixed fees. Until agreement has been reached as to the amount of the allowance for the fiscal year, DOE will pay a provisional allowance at the same rate as that applicable with respect to the preceding fiscal year, and following such written agreement, prompt adjustment shall be made of any differences between the provisional and the agreed upon allowance for the year. If at the end of any fiscal year during the term of this contract the amount of unexpended accumulations from the allowance provided for under this contract exceeds the sum of $500,000.00 as shown on financial statements certified by independent auditors selected by the Contractor, the Contractor shall pay to DOE the amount of such excess. The unexpended management allowance, up to the limit stated above, may be used at the discretion of the Contractor for programs supported under the contract; however, any

unexpended balance remaining upon expiration of the term of this contract, unless extended by mutual agreement, will be returned to the DOE.

(2) The parties hereto agree that the total of the Contractor's management allowance and the fixed fees payable to Contractor's two designated subcontractors shall not exceed the amount calculated in accordance with the Research and Development (R&D) fee schedule set forth in DEAR 970.1509-5. The fee base will be calculated in accordance with DEAR 970.1509-6, except the fee base shall include the cost of these two designated subcontractors.

Rationale

The management allowance concept was proposed in the RFP in lieu of a fixed fee. The SEB proposes to continue this practice into the contract. The SEB recognizes that DEAR 970.1509-3(a) provides that "unless there is reason to do other, it is the general policy of DOE to pay fees for a management and operating contract with a nonprofit organization ..." DEAR 970.1509-2(b) provides, in part, that it may be, under special circumstances, permissible to reimburse or pay a management allowance to any educational institution.

The SEB believes that the special nature of the URA organization (a non-profit organization consisting of educational institutions as its members) justifies the use of a management allowance.

An analysis of the URA proposal reflects that the management allowance to URA, when added to the fees paid to EG&G and SVC, is still within the R&D fee schedule set forth in DEAR 970.1509-5 that URA could be entitled to during the nine month period starting January 1, 1989 if URA was to receive a fixed fee. The concept of having the combined allowance/fees fall within the R&D fee schedule was discussed with URA, EG&G and SVC and the team stated that the principle of the allowance/fee combination being within this ceiling amount would continue for the duration of the contract.

The amount of the management allowance will be negotiated on an annual basis by URA with the Contracting Officer. The Contracting Officer will control URA's management allowance based on the negotiated procedure proposed; these controls would not be present under a fee situation. Among these controls are the review and negotiation of the proposed budget for the annual management allowance and review of the actual audited costs for prior years. Meaningful discussions can be conducted between the parties regarding the previous actual costs and the proposal for the succeeding year.

In addition to the clause itself, the SEB proposes to include a $500,000 allowable "unexpended carryover". The unexpended carryover results from the difference, if any, from the negotiated management allowance and the actual audited costs incurred. These funds may be retained by URA but are limited to the advancement of selected programs.

The rationale for allowing carryover is to provide URA a means of accumulating a relatively small fund for unforseen expenses and emergencies. Since URA does not have any corporate assets the SEB feels it is appropriate to allow URA some small amount of operating capital. The unexpended balance is limited to advancement of selected programs under the contract which the SEB believes is a solid basis for having the "allowable carryover" concept.

The fixed fees being paid to both EG&G and SVC obviously do not have the same level of controls or oversight as URA's and no similar provisions will be sought for the designated subcontractors.

b. Deviation

Subparagraph (d)(8)(i), beginning in line 10, the phrase "at an annual rate of $60,000.00 or more" is deleted and the phrase "in excess of the annual rate established in Appendix B" is substituted therefor.

Rationale

The provision was removed from the contract and incorporated in Appendix B. The effect of the provision is not altered and it can now be adjusted administratively.

c. Deviation

Subparagraph (d)(8)(v), the parenthetical beginning in line 1 and continuing into line 4, is deleted.

Rationale

The limitations on the various types of personnel training were eliminated. The proposed language is consistent with that of an educational/non-profit organization.

d. Deviation

Under paragraph (d), subparagraph (19) through (24) are added as follows:

(19) Rentals and leases of land, buildings, and equipment (except construction plant and equipment, see item (d)(18) above) owned by third parties, where such items are used in the performance of the contract, subject to such approval as the Contracting Officer may require.

(20) Repairs, maintenance and inspection of contractor-owned property used in connection with the performance of this contract, including reasonable standby facilities, which are due to ordinary wear and tear from use and the action of elements, provided such maintenance and repairs keep the property in efficient operating condition and do not add materially to its permanent value or appreciably prolong its intended useful life; and major repairs (including replacement) to such property, as directed or approved by the Contracting Officer when charged directly to the contract.

(21) Art work, including models and mock-ups, as approved by the Contracting Officer.

(22) Reports and other costs for the dissemination of scientific or technical information.

(23) Structures and facilities of a temporary nature, subject to the approval of the Contracting Officer where the estimated costs exceeds $2000.

(24) Subject to the same procedures and approvals as are required by Article 15, Litigation and Claims, costs associated with the defense of claims and suits against contractor employees, including attorneys fees, judgments, court costs, and settlements, to the extent that the liability of the employee and the cost attendant thereto are not otherwise covered by insurance; provided, however, that the errors, omissions, or actions of the employee giving rise to such claim or suit are within the scope of his employment, and were not caused by or did not arise out of his willful fault or wanton misconduct.

Rationale

These provisions are currently in the FNAL contract except that provision (21) had the words "reproduction costs" deleted from the "Reproduction and Art Work" provision. The reproduction (report preparation) costs are already covered in other examples. The art work costs generally refers to landscape-type improvement items. These additional examples of allowable cost are consistent with the scope of the work to be performed and have been previously approved by DOE.

e. Deviation

Subparagraph (e)(3), the phrase "except for such expenses and costs which are incurred pursuant to the provisions of this contract" is added after the word "proposals".

Rationale

Revisions clarified allowability for certain proposals (e.g., annual budget proposal, work for others) that are authorized pursuant to the contract.

f. Deviation

Subparagraph (e)(12),the phrase "provided that fines and other liabilities incurred by the contractor in the performance of this contract are allowable as long as such fines liabilities are not the result of willful misconduct or lack of good faith on the part of any of the the Contracting trustees, overseers, corporate officers, or the Laboratory Director or Deputy Director" is added following the work "payments" in the last line.

Rationale

Text was taken from the current FNAL contract which more clearly sets forth the intent of the DEAR 970.3102-21 regulation then the example of unallowable costs found at 970.5204-13(e)(12).

g. Deviation

Subparagraph (e)(14), the phrase "except with the prior written approval of the Contracting Officer." is added in the last line following the phrase "Clause 12".

Rationale

As revised, the provision reserves the right for DOE to authorize URA to pay certain insurance. This provision allows for commercial insurance which may be required on selected elements of the project (such as shipping the magnets).

h. Deviation

Subparagraph (e)(16), the phrase "(other than in furtherance of work under this contract as approved by the Contracting Officer)." is added in the last line following the word "litigation".

Rationale

This provision applies solely to DOE requesting the Contractor to prosecute or defend a patent infringement litigation issue. The CO holds final authority on this issue and the Government benefits from reserving the right to have Contractor perform this effort.

i. Deviation

Subparagraph (e)(17)(ii) the word "directors" is deleted from line 2, and line 3, the phrase "trustees, overseers, Laboratory Director, or Deputy Director" is substituted for the phrase "or a supervising representative of the Contractor, as defined in Clause 12 of this Contract."

Rationale

URA proposed that only the highest levels of management are liable as a result of willful misconduct or lack of good faith. This is consistent with their corporate approach and the SEB agreed to the provision.

j. Deviation

Subparagraph (e)(23) the sentence "DOE agrees that it will assume possession at that time of all Government owned records under this contract, their in the Contractor's possession." is added following the word "records" in line 3.

Rationale

DOE had no objection to this request because of URA's status as a non-profit and this relieves them of an unnecessary burden.

k. Deviation

Subparagraph (e)(35) is deleted and the following is substituted in lieu thereof:

(35) Costs incurred by Contractor personnel for travel, including costs of lodging, other subsistence and incidental expenses, which exceed those costs allowed by Public Law 100-679, Office of Federal Procurement Policy act of 1988.

Rationale

Due to enactment of P.L. 100-679, there is no basis to object to this recommended deviation. However, lodging, meals and incidental expenses, which exceed the corporate policy levels, remain unallowable.

2. FAR 52.233-3 Protests After Award - Alternate I

Deviation

This article has been deleted.

Rationale

Since no other offer was received in response to RFP No. DE-RP02-88ER40486, there does not appear to be any possible basis for protest. Furthermore, DOE retains sufficient control over the work that if a protest was received DOE could effectuate the procedural aspects contained in the FAR clause.

B. Contractor and Contract No.

Contractor: Universities Research Association, Inc.

Contract No. DE-AC02-88ER40486

C. Previous Requests

No previous request for the FAR deviations have been made. The deviations in Article 8, Allowable Costs and Management Allowance, except for item (e)(35) have been previously granted for URA under Contract No. DE-AC02-76CH03000 for FNAL.

D. Effect of the Deviations

These deviations, if approved, will be in effect for the terms of this contract (January 1, 1989 through December 31, 1997), as well as for the additional five year term if DOE unilateral right to extend this contract is exercised.

If you approve, please sign your name in the space provided.

Edward G. Cumesty, Chairman
Source Evaluation Board for
the SSC

Concur: Steven A. Silberglied
Office of Chief Counsel

Approved: _____
Hilary J. Rauch, Manger
Chicago Operations Office
Head of Contracting Activity

Date: _____

Request for Deviation Authority

Pursuant to Subpart 901.4 of the Department of Energy Acquisition Regulations (DEAR), the Procurement Executive has authorized that the following deviations to standard DEAR provisions may be approved by Heads of Contracting Activities:

1. Deviations and Rationale

1. DEAR 970.5204-11 - Changes (APR 1984)

Deviation

The phrase "except as otherwise agreed in writing by the Contracting Officer, the Contractor shall insert the following provisions in its subcontracts with its two designated subcontract:" was added as a prefatory statement to this article.

Rationale

The article as now written allows for a change to the fixed fee if a material change in the amount of work occurs for the designated subcontractors. The deletion of the article from the prime is consistent with the management allowance concept agreed to by the parties that does not allow for adjustment, even if there is a material change. Therefore, there is no basis to retain the article in the prime except as a flowdown provision.

2. DEAR 970.5204-25 - Workmanship and Materials (APR 1984)

Deviation

The phrase "except as otherwise agree in writing by the Contracting Officer, the Contractor shall insert the following provision in all subcontracts:" was added as a prefatory statement to this article.

Rationale

URA maintained during negotiations that this article was inappropriate for an M&O contractor where no drawing or specifications were being utilized. DOE concurred with this position. It should be noted, however, that this article will be required as a flow-down article to subcontracts except as otherwise approved by the Contracting Officer.

3. DEAR 970.5204-45 - Term and Termination (APR 1984)

Deviation

The phrase "Term and" was added to the title of the Article. Paragraph (a) was rewritten as follows:

(a) The term of this contract shall commence on January 1, 1989, and shall conclude December 31, 1997; provided, however, that DOE reserves the unilateral right to extend the term for an additional five-year period by written notification to the Contractor on or before June 30, 1997. And, provided, further that this contract may be terminated as follows:

Subparagraph (a)(1) was rewritten and reformated as follows:

(1)(i) The performance of work under this contract may be terminated by the Government in whole, or from time to time in part, whenever, for any reason, the Contracting Officer shall determine any such termination is for the best interest of the Government. Termination of the work hereunder shall be effected by delivery of a notice of termination specifying the extent to which performance of work under the contact shall be terminated, and the date upon which such termination shall become effective.

(ii) The performance of work under this contract may be terminated in whole by the Contractor giving written notice of termination 550 days prior to the effective date of such termination.

Termination by either party shall be without prejudice to any claim which either party may have against the other.

In subparagraph (a)(2), the phrase "by either party" was inserted in the line 1 following the work "termination".

Subparagraph (5) was deleted in its entirety, and subparagraph (6) was redesignated as subparagraph (5).

Rationale

The deletion of the default provision is consistent with other DOE agreements with educational entities. URA is a non-profit organization consisting of 66 colleges and universities. The acceptance of the 18 month requirement for URA termination is basically consistent with the Department's extend/compete time frame. The Source Evaluation Board's position is that a contractor not willing to continue to perform the activity should be allowed to remove themselves. The addition of the specific term language, including DOE option, to this article was viewed as insignificant and fully consistent with RFP No. DE-RP02-88ER40486.

4. DEAR 970.5204-16 - Payments and Advances (APR 1984)

Deviation

The following sentence was added to paragraph (c), Special Bank Account: "Appendix C to this contract incorporating the Special Bank Account Agreement may be modified from time to time, in writing, without execution of an amendment to this contract, for the purpose of effecting any changes in or addition to the Appendix C, as may be agreed upon by the parties."

Rationale

URA wished to have modifications to the Special Bank Account effected administratively by mutual agreement of the parties. DOE has no objection to the proposed change.

5. DEAR 970.5203-2 - Examination of Records by Comptroller General (APR 1984)

Deviation

In paragraph (b), line 5, following the phrase "Contractor Records Retention" and in paragraph (c), line 5, following the phrase "FAR Subpart 4.7" the phrase "unless the Contracting Officer authorizes th ir prior disposition" was inserted.

Rationale

The proposed change was agreed to insofar as cost benefits (storage, shipping) can accrue to both DOE and URA. Exercise of this provision requires Contracting Officer authorization.

6. DEAR 970.5204-21 - Property (APR 1984)

Deviation

In paragraph (f), line 5, the text after the phrase "the Contractor's" is deleted and the following is substituted therefor: "officers, trustees, overseers, Laboratory Director, Deputy Director, or Project Manager."

In paragraph (g), in lines six and seven, the phrase "if and as directed by the Contracting Officer" was deleted and the phrase "as necessary" substituted therefor.

Rationale

URA refused to accept the condition that "negligence" should be a basis to make the Contractor, an organization without its own funds, liable for the loss or destruction of Government property. The Source Evaluation Board accepted this position only after URA stated that "willful misconduct or lack of good faith" should be the only two liability standards that are applicable to a loss of property. In addition, URA refused to accept the standard "managerial personnel" definition. Their rationale was that only the highest levels of URA management should be held to the willful misconduct and lack of good faith standard. DOE concurred. Also, URA requested that authority to repair or replace damaged property should be in their discretion as the M&O. Since any damage would be reported to DOE, any objection to repair or specific directions otherwise could be issued by DOE under Article 2 - Statement of Work. Accordingly, DOE concurred.

7. DEAR 970.5204-42 - Key Personnel (APR 1984)

Deviation

The standard clause was rewritten in its entirety as follows:

(a) It having been determined that Laboratory Director and the Deputy Director are necessary for the successful performance of this contract, the Contractor agrees to appoint such individuals to these positions subject to the prior approval of the Contracting Officer.

(b) It having been determined that the Project Manager, and the Heads of the following Divisions: Magnet Systems, Accelerator Systems, Conventional Construction, Physics Research, and Laboratory Administrative Services are necessary for the successful performance of this contract, the Contractor agrees to appoint such individuals subject to prior consultations with DOE program officials.

(c) The Contractor further agrees not to remove any of the individuals appointed to the positions in (a) or (b) above, except for disciplinary reasons or internal reassignments within the SSC Laboratory, without prior consultation with the Contracting Officer. The application of this paragraph (b) shall cease on December 31, 1997.

(d) Contractor's obligation to consult on the appointment of individuals appointed to the positions in (b) above shall cease on December 31, 1997.

Rationale

DOE and URA reached a negotiated settlement specifying that only the appointment of the Laboratory Director and Deputy Director will require prior DOE approval and that the appointment of the balance of the key personnel will only require consultation with DOE. Because this effort is more comprehensive than simply the management of an on-going laboratory, the SEB desired to have additional input into the staffing decisions for key positions. Therefore, the consultation requirement for those positions identified in paragraph (b) was added.

8. DEAR 970.5204-19 - Printing (APR 1984)

Deviation

In paragraph (c), the phrase "unless otherwise agreed in writing by the Contracting Officer" was added.

Rationale

Provision for Contracting Officer authorizing otherwise unallowable costs provides discretionary authority to the Contracting Officer should such authority be authorized in a DOE directive.

2. CONTRACTOR AND CONTRACT NO.

Contractor: Universities Research Association, Inc.
Contract No.: DE-AC02-88ER40486

3. Previous Requests

No previous request for deviation authority has been made.

4. Effect of the Deviations

These deviations, if approved, will be in the term of this contract (January 1, 1989 through December 31, 1997) as well as for an additional five year term if DOE's unilateral right to extend this contract is exercised.

Approval of the above mentioned deviations is hereby made.

Hilary J. Rauch, Manager
Chicago Operations Office

Date: 12/14/88

Concur: Steven A. Silberglerd
Office of Chief Counsel

Date: December 18, 1988

Mr. WOLPE. It details where the DOE URA contract deviates from the Department's regulations.

The property clause is a standard clause in all DOE's contracts that defines which contractor employees are accountable for damage to Government property and under what terms they are held accountable. As we will see on pages 6 and 7 of this document, the contract with URA only holds three on-site people accountable—the lab director, the deputy director, and the project manager. Even then, they're only accountable if they "engage in willful misconduct or lack of good faith."

All other people on-site, including key personnel such as the general manager and all the associate directors that actually oversee important activities—like a $1 billion construction project, or a $2 billion magnet acquisition program—are exempt from accountability. Is that correct?

Mr. GIBBS. I'm sorry. Which paragraph are you on? Are you still on page 6?

Mr. WOLPE. I'm talking about pages 6 and 7.

Mr. GIBBS. What was the exact question?

Mr. WOLPE. The contract with URA appears to hold only three on-site people directly accountable—the lab director, the deputy director, and the project manager. Even they are only accountable if they engage in willful misconduct or lack of good faith.

All other people on-site, including key personnel such as the general manger and all the associate directors that actually oversee important activities—like the $1 billion construction project and the $2 million magnet acquisition program—appear to be exempt from accountability. Is that correct?

Mr. CIPRIANO. In a legal sense, yes.

Mr. WOLPE. In looking at the rationale for this deviation, it frankly escapes me as to how the Department allowed that to be inserted. Apparently URA first got the Department of Energy to agree that URA personnel should not be held accountable for the negligent standard usually included because URA had no assets. Then once DOE agreed to limit the liabilities standard to willful misconduct and lack of good faith, URA turns around and says, "If that's the standard, only the highest levels of management can be held to that."

So DOE comes up with a contract where most of the people on site are not accountable for their actions, and the very top people are only accountable under very extreme circumstances. Why did the Department agree to something like this?

Mr. CIPRIANO. There is nobody here today that was involved in this contract negotiation, and therefore I think we'll have to give you an answer for the record on that question.

[The information follows:]

URA PROPERTY CLAUSE

At page 174 of the transcript it was suggested that DOE has relaxed the standard for liability as to URA. The standard itself has not been relaxed. DEAR Section 970.5204-21 Property, provides that contractor personnel will only be liable for the loss or damage of Government property if it results from "willful misconduct or lack of good faith." This is the standard included in URA's contract without deviation.

The deviation, therefore, relates not to the substantive standard, but rather relates to the responsibility level of employees whose actions can create liability on

the part of the contractor. Here, in fact, a deviation was authorized by DOE. The deviation clarifies and limits the number of employees that can, by their actions, create potential liability on the part of URA. DOE authorized this deviation because of URA's nonprofit, non-fee status. The explanation under management allowance below explains this unique status, and provides justification for limiting URA's exposure, and also explains why this benefit is mutual to DOE as well. In summary the reason is that URA is paid no fee or profit from which it can either indemnify its employees or purchase insurance. The alternative would be to authorize URA to purchase insurance for simple acts of negligence and make it an allowable cost under the contract. DOE does not choose to bear this expense, as practice has demonstrated it is not the most economical method.

The *"Request for Deviation Authority"* cited in the testimony at page 174 needs explanation. This refers to an action taken at a time when the scope of application of the then-proposed rule on contractor accountability had not been definitively established. The deviation was granted, as requested. When the accountability standards were issued as the Interim Final Rule (IFR); however, they were not made applicable to nonprofit, non-fee contractors. Accordingly, URA has been granted no preferential treatment under its contract. Its standard of risk for liability under the property clause was consistent with then applicable regulations, and remains consistent with current regulations as well.

Mr. BARTON. Could we have a definition of accountability? It's my understanding that everybody on the site can be fired for not doing their job.

Mr. CIPRIANO. That's right. They can be fired.

Mr. BARTON. If there is criminal conduct of any type they can be prosecuted, just like anybody else.

Mr. CIPRIANO. Yes, that's correct.

Mr. GIBBS. I think the other thing I would like to add is—Ed Cumusty was up here and talked with our staff earlier this week. He reaffirmed to me that in this arena this fully complies with the applicable DEARs that were in place at the time. For this type of contract for a non-profit organization such as URA, this is still the applicable DOE policy. Beyond that, we'll have to get you something more for the——

[The information follows:]

CONTRACT FORMATION PROCESS FOR THE SSCL

The Department of Energy issued a Request for Proposal (RFP) for the design, constuction, and operation of the SSC on August 19, 1988. A model contract was included in that RFP to provide a basis for the respondents in developing their proposals and eventual negotiation positions. The provisions in that model contract were standard provisions and clauses from the Federal Acquisition Regulation (FAR) and the Department of Energy Acquisition Regulation (DEAR) as appropriate to a DOE management and operating (M&O) contract. In addition, The Source Evaluation Board (SEB) formed to process this procurement requirement anticipated requests for alterations in the model contract depending on the particular respondents. Universities Research Association (URA) provided the only response to the RFP.

At the start of discussions, URA advised the SEB that their general intent was to negotiate from the basis of their existing contract with DOE for the operation of Fermilab.

The DOE SEB developed its position by considering: (i) the model contract, which was acceptable to DOE Headquarters; (ii) any specific Fermilab provisions requested by URA that had been approved by Headquarters; and (iii) evaluation of other URA comments. The SEB saw benefit for DOE arriving at an SSC contract that mirrored the Fermilab terms and conditions unless a change in DOE policy had occurred in the interim. A similar view was expressed by the URA negotiating team.

The final negotiated contract with URA for the SSC establishes the same relationship between the Government and URA as exists at Fermilab with regard to the fundamental issues of responsibility and accountability. There are some differences between the two contracts due to clauses that were not in effect at the time of the most recent Fermilab contract renewal but included in the RFP model contract. Other differences in language reflect independent parties attempting to come to an

agreement based on a "fresh look" at issues. In one case, "Terminations", URA requested the ability to terminate the contract. No such provision exists in the Fermilab contract. Agreement was reached to permit URA to withdraw from the contract on eighteen months notice to DOE. This time frame is the normal amount of time DOE uses to complete an M&O contract.

Mr. WOLPE. That's the point. There is no secret that this concern that I'm raising with respect to his project is a concern that has been advanced with respect to many other undertakings in the Federal Government.

Mr. BARTON. Could the Chairman enlighten the rest of the Oversight Subcommittee? Is this particular contract different from the URA contract they have to operate the Fermi Lab? Is that your understanding.

Mr. WOLPE. I don't—that's not my understanding, but perhaps our witnesses could clarify that.

Mr. GIBBS. I believe it's the same, but we can confirm.

Mr. CIPRIANO. We have a non-profit contractor with no assets that is highly motivated to do a good job because they are the ultimate user of the thing they're building for us.

Mr. BARTON. If it's not different than the contract with Fermi Lab, have there been accountability problems at Fermi Lab under the existing contract to your knowledge?

Mr. CIPRIANO. Not to my knowledge, no.

Mr. WOLPE. The problem of course is that if any of these employees, by negligence, loses or destroys the magnet or other equipment, then there is no going back on the contractor for accountability for that.

Mr. CIPRIANO. And that's reasonable, since the contractor has no assets.

Mr. WOLPE. That was the choice the Department of Energy made, to hire a contractor that had no assets.

Mr. CIPRIANO. Correct.

Mr. WOLPE. Is that not the fundamental question?

Mr. CIPRIANO. That is correct. So you could essentially pay for that right. In other words, you could pay—a different type of contractor would charge you a general administrative fee that they would attach to their direct charges an amount of money to cover such eventualities. In this case, since we're dealing with a non-profit firm, we don't allow them to tack those kind of costs onto the contract, and we assume, therefore, that responsibility.

Mr. WOLPE. It's just important that we understand fully the risks that have been undertaken, given the matter in which this contract has been established. That's the point I'm trying to bring out here.

I would like to look at the management allowance at this point in a little more detail. I'm going to introduce in to the record, without objection, several charts obtained from DOE communications that break down the management allowance.

[The referenced charts follow:]

MANAGEMENT ALLOWANCE PROPOSAL URA - DE-AC02-76CH03000
FISCAL YEAR 1991

	Actual FY 88 Expenses		Actual FY 89 Expenses		Actual FY 90 Expenses		Approved FY 90 Budget		Approved FY 91 Budget
Direct Salaries	$ 357,500		$ 402,600		$ 468,900		$ 652,800		$ 619,900
Officers	273,500		286,900		362,300		380,400		400,800
Staff	52,300		77,000		99,800		246,900		211,100
Other	31,700		38,700		7,300		25,500		8,000
Benefits	106,600		121,800		117,700		152,500		156,600
Fees/Honoraria	67,300		36,500		4,300		11,100		8,000
Insurance Consultant/Legal	1,400		100		-0-		100		-0-
Honoraria	6,800		11,400		-0-		1,000		-0-
SSC Board Chairman	24,800		17,600		-0-		-0-		-0-
SSC Staff Support	34,300		7,400		-0-		-0-		-0-
Travel	155,200		192,400		221,000		292,000		289,000
Officers and Staff	38,300		59,800		54,600		106,000		84,000
Trustees	38,700		7,600		18,300		14,000		20,000
Other/Committees	30,300		33,400		38,800		47,700		43,000
Overseers	47,900		91,600		109,300		124,300		142,000
Supplies/Leases	20,400		18,200		50,700		49,800		29,500
Equipment Depreciation	-0-		-0-		19,200		20,000		19,200
Services	160,300		175,900		211,300		198,000		269,000
Communications	19,500		26,400		16,800		34,700		18,500
Accounting and Auditing	67,500		73,800		121,800		98,200		146,600
Insurance and Other	73,300		75,700		72,700		65,100		103,900
Office Rent	75,900		78,900		123,400		153,800		158,500
Discretionary for Laboratory	164,800		230,200		329,200		353,000		522,600
Civic Participation	800	FNAL	163,000	FNAL	172,000	FNAL	174,000	FNAL	215,600
Transportation	2,100	SSCL	34,000	SSCL	121,800	SSCL	122,000	SSCL	268,000
Director's Fund	11,000	URA/HQ	33,200	URA/HQ	35,400	URA/HQ	57,000	URA/HQ	39,000
User's Center	37,900								
Meetings and Hospitality	69,100								
SSC	12,200								
Employee Morale	31,700								225,000
Scholarship Fund	121,900		145,100		175,900		225,000		$2,297,300
Totals	$1,229,900		$1,401,600		$1,721,600		$2,108,000		

SOURCE: 3/8/91 Memo to File, J. Cipriano, A. Mravca
"Proposed FY 91 URA Management Allowance"
U.S. DOE, SSC

URA MANAGEMENT ALLOWANCE

DISCRETIONARY FUNDING

FUNCTIONAL CATEGORY DISTRIBUTION

FY 1991

($000)

	FY90 ALLOWANCE	FY90 ACTUAL	FY91 REQUEST
FERMILAB TOTAL	$ 174.0	$ 172.0	$ 215.6
Employee morale	60.0	38.6	45.2
Meetings Illinois	57.0	55.9	68.0
Transportation	20.0	15.6	20.0
Director's fund	10.0	7.0	10.0
Civic	2.0	2.3	3.0
Users Center	25.0	17.4	25.0
Non-contract printing	-0-	35.2	44.4
SSC LAB TOTAL	$ 122.0	$ 121.8	$ 268.0
Employee morale	46.0	17.6	30.0
Meetings Texas	38.0	64.4	120.0
Transportation	8.0	7.3	10.0
Director's fund	15.0	30.0	25.0
Civic	5.0	2.5	25.0
Ground breaking	10.0	-0-	50.0
URA HQ TOTAL	$ 57.0	$ 35.4	$ 39.9
Meetings/Hospitality			
D.C.	29.0	18.4	20.3
Fermilab	13.0	9.5	10.4
SSC Lab	15.0	7.5	8.3
GRAND TOTALS	$ 353.0	$ 329.2	$ 522.6

Enclosure (3)
Attachment A

SOURCE: 11/5/90 J. Toll, (URA) Letter to J. Cipriano U.S. DOE, SSC

FY91 SSCL DIRECTOR'S DISCRETIONARY FUND PROPOSAL SUPPORT INFORMATION

	REQUESTED AMOUNT	
MORALE		
Holiday Party This amount represents the URA subsidy of the actual costs of the December 1990 Holiday party.	$12K	
Picnic This is based on assumed attendance of 1,000 URA family members at a cost of $10 per person.	$10K	
Anniversary Party This represents the cost of refreshments for 1,000 employees at $3.00 per person.	$3K	
Plaques and Awards These are tokens of recognition for employees for exceptional performance and/or contributions to the project.	$1K	
Departmental Milestone Achievements The purpose of these gatherings is to provide an opportunity for employees to participate in the accomplishment of major milestones. Estimated costs is $500 per event. Examples are: 1. Installation of the first SSC ion source. 2. Completion of the MDL building. 3. Finalization of machine parameters.	$4K	
Subtotal		$30K
MEETINGS AND HOSPITALITY		
Meetings and Hospitality The FY90 expenditures in this area amounted to $64K. This total covered hospitality to visiting dignitaries from local and international communities including Nobel Prize winners, politicians, media personnel, etc. It also covered cost of recruiting scientific personnel and the various national and international routine meetings (Program Advisory Committee, etc.). We have doubled the estimate for FY91 to cover the additional efforts associated with solicitation of foreign contribution to the TEC. This includes meetings with representatives from foreign laboratories to discuss collaboration and provision of funds to the project. Examples are: 1. TRIMPH (Canada) - HEB design. 2. Novosibirsk (USSR) - MEB design. 3. KEK (Japan) - provision of HEB magnets. 4. SACLAY (France) - Collider quadrupoles. 5. IHEP (Beijing, China) - Resistive connector elements. 6. International Detector Design Collaboration. The total FY91 effort will include delegations of numerous laboratory groups meeting with their counterparts. The estimated number of meetings is in the range of 30-35.		$128K

SOURCE: U.S. DOE, SSC

FY91 SSCL DIRECTOR'S DISCRETIONARY FUND PROPOSAL
SUPPORT INFORMATION

TRANSPORTATION

Director's Vehicle — $10K
FY90 actuals were $7.5K. The increase represents increased usage brought about by more trips to the Ellis County site and corresponding maintenance.

DIRECTOR'S FUND

Foreign Carrier Travel — $20K
The actual costs in FY90 was $12K. The current war crisis makes it necessary to use foreign carriers for safe travel on crucial lab business. The estimate is based on seven trips at $3K per trip. Year-to-date, we have authorized three such trips.

Relocation Supplements — $4K
Actual Cost in FY90 was $3.7K.

Supplemental Insurance for Art Work in Lab Lobby — $1K

Subtotal — $25K

CIVIC PARTICIPATION

Asian Pacific Chamber Sponsorship	$2.5K
Hispanic Chamber Sponsorship	$2.5K
Black Chamber sponsorship	$2.5K
Ellis County and Other Local Community Receptions	$17.5K
Subtotal	$25K

Attracting qualified minority vendors and employment candidates is part of the Laboratory mission. Sponsorship of the aforementioned Chambers of Commerce will do much to forward the Lab's commitments in this area.

Providing forums in which to meet and acknowledge community members in obtaining their support for laboratory presence in the community is necessary. This effort will aid the process of land acquisition and construction of the project. Several events are being planned including the MDL completion and occupancy celebration scheduled for this spring.

GROUND BREAKING CEREMONY

Hospitality	$30K
Equipment Rental	$20K
GRAND TOTAL	$268K

This is exclusive of Texas funding or Community donation.

URA HEADQUARTERS MEETINGS/HOSPITALITY

FY 1991 MANAGEMENT ALLOWANCE

DATA SUPPLEMENT

	FY90 ALLOWANCE	FY90 ACTUAL	FY91 REQUEST
URA HQ/DC TOTAL*	$ 29.0	$ 18.4	$ 20.1
Board of Trustees		5.0	5.5
Council of Presidents		2.0	2.2
Capitol Hill reception(s)		10.0	11.0
Foreign Delegation(s)		1.0	1.1
Miscellaneous meetings		.4	.5
SSC LAB SPECIFIC	$ 15.0	$ 7.5	$ 8.1
National conferences		5.0	5.5
SSC Board of Overseers		2.5	2.8

* SSC would pay 50% of the total request

USE OF MEETINGS/HOSPITALITY FUNDS

URA as management and operating contractor for FERMILAB and the SSC LAB is responsible to the DOE for proper management of the research and construction programs of those laboratories and for the expenditure of the resources provided to accomplish the approved programs. The URA corporate organization is structured to fulfill these responsibilities through a Council of Presidents, Board of Trustees, Boards of Overseers, corporate officers and staff and a variety of visiting and advisory committees.

Meetings and hospitality funds are used in partial support of the activities of these various organizational components. The funds are used to defray the costs of renting facilities for conferences, meetings and receptions when URA space is inadequate for the size or purpose of the function. Catering costs of the functions (ie. continental breakfast, coffee, working lunches and dinners, etc.) are also paid from this funding source.

SOURCE: 2/11/91 K.R. Shirley (URA) Letter to T. Cone, SSC
U.S. DOE, SSC

The following provides FY90 experience in the use of M&H funding:

The annual Council of Presidents meeting was held at the National Academy of Sciences in February with an attendance of approximately 100 representatives of URA member universities and other interested parties (ie. DOE, NSF, NAS, NAE, etc.). A meeting of the Executive Committee of the Council was held at the COSMOS Club on the evening prior to the Council meeting.

The Board of Trustees met four times in FY90. The size and purpose of two of the meetings required the use of hotel facilities, the Adolphus in Dallas and the Crystal City Marriott in Virginia. These meetings were timed and placed to facilitate interactions with the TNRLC and SSC Board of Overseers.

Annually, in conjunction with other URA Board meetings, URA hosts receptions in Washington for the purpose of interacting with those within Congress, the Administration and industry who are vital to the continued support of URA Laboratory programs. These receptions are usually catered in hearing rooms on Capitol Hill. The list of 600 invitees is growing steadily in proportion to the interest in URA being generated by the SSC project.

URA also recognizes its responsibility to the US scientific community by providing hospitality for various foreign delegations that visit Washington and the Laboratories. In FY90 URA hosted a delegation of scientists visiting from the USSR.

URA continues to provide hospitality support for a variety of national conferences on high energy physics. In FY90 URA provided hospitality support for the Atlanta conference on the SSC.

The SSC Board of Overseers and its various committees met 11 times in FY90. URA provided M&H support for over 300 person days associated with these meetings.

<u>The FY91 M&H funding request is based on a continuation of the FY90 level of support plus an anticipated cost escalation factor of 10%.</u>

Mr. WOLPE. Sources for each chart are noted at the bottom. The first chart shows the overall breakdown, the first item that is now being distributed to you. What stands out is the next to the last figure of $225,000 for a scholarship fund.

Let me grant you that the items contained within this question of the management allowance are not the largest ticket items within this overall project. Nonetheless, I think it's important. There are some kinds of questions that just pop out at one as you look at this management allowance and some of this itemization here. I think we have some obligation to try to understand what is going on here.

The first item that stands out, as I said, is this $225,000 for a scholarship fund. Mr. Gibbs, what is a scholarship fund?

Mr. Cipriano?

Mr. CIPRIANO. It's a fund that is established for employees of URA—children of employees of URA.

Mr. WOLPE. In other words, we provide scholarships for the children of all URA employees?

Mr. CIPRIANO. As a benefit. There are—when it is typical in a university system that—university professors, when they are associated with the university, get provided as part of their compensation free tuition for their children at the university. We have attempted to draw from that same pool of expertise. In order to do that, we have tried to match that compensation package, including that part of it.

Mr. WOLPE. How much are these scholarships?

Mr. CIPRIANO. I think they vary by the individual situation.

Mr. BARTON. Mr. Chairman, could we have them explain what URA really is? That might be somewhat enlightening instead of just the letters. What is URA?

Mr. SISKIN. URA is an association of the 79 universities of this country and Canada that have high energy physics programs. The board consists of the presidents of those universities. It is a structure by which the high energy physics community in this country can bring to bear the attention and talent to address something like the collider.

Mr. WOLPE. They are a non-profit contractor that chose to bid for this contract. Is that not correct?

I would argue—at least I think a taxpayer would argue that they have to assume certain obligations and risks themselves as a condition for them being competitive in that process.

Mr. SISKIN. In any case—and having just come from a commercial corporation—you always include in your pricing a certain reserve in case you have problems. So if you were talking about trying to apply the same standard to URA, then an appropriate 5 percent or 10 percent allowance to the price of the total work done by URA would be an appropriate number applied. This is the company's self-insurance. In this case, the Department of Energy is becoming the insurer of choice. It's a practical and economic way to approach this.

With respect to an ability to competitively go out for another company that might do this on a commercial venture, there is——

Mr. WOLPE. I would like to move on here, If I can.

It's my understanding that the scholarships run about $3,000 each, so the fund effectively supports about 75 children. Is that correct?

Mr. SISKIN. I'm sorry. I don't have the details.

Mr. WOLPE. Do you know anything about it? Is it based on need, or competition?

Mr. SISKIN. No, I don't. I can find out and provide it for the record.

[The information follows:]

Committee: Science, Space and Technology
Subcommittee: Investigations and Oversight
Date: May 9, 1991
Witness: Garry W. Gibbs
Page: 180
Line: 4307

INSERT FOR THE RECORD

Superconducting Super Collider Laboratory
2550 Beckleymeade Avenue, Suite 500
Dallas, TX 75237-3946

MEMORANDUM

TO: All URA Staff

FROM: Douglas Kreitz, Personnel Director

DATE: May 20, 1991

SUBJECT: URA Scholarship Program

Each year URA offers a limited number of four-year college scholarships to children of its full-time employees. The scholarships are equal to the amount of the tuition and fees at the university of the student's choice, but cannot exceed $3,000 per year. Scholarships are renewable for up to four years as long as the student continues in good academic standing. Children of employees who are preparing to enter their freshman year of college and enroll in course work leading to a Bachelor's degree or its equivalent are eligible to apply.

Awards are made on a competitive basis as determined by the scores made on the Scholastic Aptitude Test (SAT) examination. SAT tests are required by many colleges/universities for admissions. Students may arrange to take the SAT test through their high schools.

Information on URA scholarships and scholarship applications may be obtained from Kimberly Linker-Thunborg, x1562, in the URA Personnel Department.

Prepared By: Ralph H. De Lorenzo
Date: June 26, 1991
Phone: (301)-353-3541
Coordinated With:
Reviewed By:

Mr. WOLPE. I understand that URA has actually asked to increase that fund to $269,000 this year, a $44,000 increase. Is that correct?

Mr. CIPRIANO. Yes.

Mr. WOLPE. It was turned down by DOE. The request was turned down.

Mr. CIPRIANO. Yes.

Mr. WOLPE. The next item I would like to ask about is the one marked discretionary funds. The total there is some $522,000 dollars, $268,000 for the SSC lab, $215,000 for the Fermi Lab, and $39,000 for URA headquarters. The second sheet of the packet breaks out these funds.

I must say that some of these funding categories—employee morale, director's funds, ground-breaking, hospitality—seem rather curious. Are there specifics of the criteria DOE applies in determining whether or not to approve these?

Mr. CIPRIANO. It has to be demonstrated that it continues to the success of the project.

Mr. WOLPE. That's all? There is no other criteria, broad characterization, that contributes to the success of the project?

Mr. CIPRIANO. There are other criteria of legalities and appropriateness and so forth that are looked at, of course, in reviewing them.

Mr. WOLPE. Would you submit to the committee the precise criteria that are used there?

Mr. CIPRIANO. Certainly.

[The information follows:]

Committee: Science, Space, and Technology
Subcommittee: Investigations and Oversight
Date: May 9, 1991
Witness: Garry W. Gibbs
Page: 181
Line: 4334

INSERT FOR THE RECORD

URA Management Allowance

Within the nonprofit community, the Department's current policy and practice makes a distinction between nonprofit institutions. As set out in Part 970-1509-3 of the DEAR, DOE's policy is to pay a fee to nonprofit institutions other than educational institutions, but provides that this issue can be subject to negotiation. The amount of such fee is prescribed to be 25% less than for a profit contractor to recognize the tax benefits of nonprofit status.

With respect to educational institutions such as URA (URA is a consortium of 79 universities with High Energy Physics programs), the policy of DOE, as expressed in DEAR Section 970.1509-2, is generally not to pay fees for M&O contracts. The stated section, however, makes it permissible to pay nonprofit educational institutions a "management allowance," provided such an allowance can be justified. Aside from the statutory restrictions on the amount of fee for research and development, and tax considerations, the amount of a management allowance is limited by reasonableness and could be as much as a nonprofit fee.

Traditionally, a management allowance is a prospective agreement for that portion of the cost of the contractor's home office overhead which is estimated to be allocable to the contract plus a small amount for costs which would be unallowable under the contract (representing the costs of corporate activities that would normally be supported by commercial profits). This is the basis for the current management allowance paid to URA. The amount of the management allowance for the current fiscal year for all of URA is $2.297 million (representing both Fermi and SSC); the SSC share is $1.205 million.

URA was formed in June 1965 by 34 research universities to provide a nationally based organization to manage, for the Federal Government, the then-anticipated 200 billion electron volt accelerator initially named the National Accelerator Laboratory, and now known as the Fermi National Accelerator Laboratory (Fermilab) in Batavia, Illinois. The Atomic Energy Commission (one of DOE's predecessor agencies) negotiated an M&O contract with URA in January 1967 which embodied the concept of a management allowance. As part of that negotiation, the parties agreed that the operating costs of the URA corporate structure would be funded by this management allowance, which was separate from the allowable costs reimbursed for the operation of the laboratory. The amount of the allowance would be agreed upon yearly after submittal of a budget and an accounting of actual uses of the funds from the prior year. This arrangement has been ongoing with URA since 1967 and was simply extended to reflect the addition of the SSCL scope.

URA's sole purpose for existence is to manage DOE research facilities at Fermilab and the SSCL. URA does not have corporate resources of any significance, and it is paid only for its direct costs of corporate administration (to cover salaries of corporate officers, travel, insurance, and associated expenses, and to establish a small corporate reserve to insure corporate stability) plus a small amount of "discretionary" funding through the management allowance. The discretionary funding is subject to prior negotiation, and in the case of URA, unexpended amounts ultimately are recouped by the government.

Once DOE and URA reach agreement on a reasonable estimate of the amount needed by URA to maintain normal operations and perform any additional activities that the parties may agree upon for a particular year, that amount becomes the management allowance. As has been the case since 1967, this amount provides the funds for necessary expenses that cannot be reimbursed under the contract (expenses covered by fee or profit in other contractual situations) and expenses that could be reimbursed but by agreement are included under management allowance. These categories have been relatively static over the years. To the extent the agreed upon estimate is shown, by audit, to have been excessive an adjustment can be made in the next years allowance. Any underrun of the budget is put into a reserve fund that can be used by URA for activities, not inconsistent with the contract, that benefit the operation of the laboratory.

Several basic principles are used by DOE in implementing this approach:

- The allowance is designed to permit appropriate flexibility in URA operations. It includes a sufficient amount to enable URA to pay all necessary operating expenses that are not appropriately allowable under the contract. Since URA was created to meet the diverse needs of the DOE research facilities, needs that could not be fulfilled within the Federal Government structure, the allowance should not be so limited as to impair the financial flexibility which has enabled URA to maintain an independent, objective approach to these needs and has allowed it to attract and retain high-caliber talent to carry out the DOE missions.

- No amount is included in the allowance for the express purpose of conducting independent research.

- No amount is included for URA to accumulate working capital.

- The allowance is large enough to allow URA to accumulate a small management reserve to provide operational stability for a specified period of time. Once an appropriate level of reserve has been reached (currently set at $500 thousand) no further amount will be negotiated for that purpose until the reserve falls below that amount. It should be noted that URA has agreed to give residual right to the Government to any balances remaining in the reserve upon dissolution of URA or upon termination or expiration of the contract.

- The parties have also agreed that the total of the allowance and the fixed fees payable to URA's designated subcontractors shall not exceed the amount calculated in accordance with the Research and Development Fee Schedule set forth in DEAR Section 970.1509-5. The fee base will be calculated in accordance with DEAR Section 970.1509-6.

DOE has carefully analyzed the URA Management Allowance, using tests of reasonableness and appropriateness similar to those applied to expenses under the contract (e.g. salaries of corporate officers, travel expenses, numbers of board meetings, etc.) and experience with other organizations operating similar

facilities. In addition, the nearly twenty-five year base of information on the use of a management allowance with URA provides a source of relative comparison in determining reasonableness

From an overall standpoint URA's management allowance of $1.205 for fiscal year 1991 is reasonable, especially if one considers DOE's current fee guidelines. Also, the current management arrangements between DOE and URA appear to be favorable to the Department by either absolute measure or comparison with other National Laboratory contractors. The disposition of URA's management allowance meets DOE's needs, is corroborated annually by independent public accountants, and provides assurances to DOE that the application of the allowance is consistent with previous DOE/URA agreements.

URA Accountability

The contractual instrument referred to in the testimony that is between the U.S. Department of Energy (DOE) and Universities Research Association is identified as a management and operating contract (M&O). This type of contract is designed to dedicate the technical and administrative skills of private organizations to a significant Federal mission in a close, long-term cooperative relationship.

Both the Federal Acquisition Regulation (FAR) and the Department of Energy Acquisition Regulation (DEAR) recognize the M&O contract as a distinct concept. The FAR defines M&O contract as "... an agreement under which the government contracts for the operation, maintenance or support, on its behalf, of a Government -owned or -controlled research, development, special production or testing establishment wholly or principally devoted to one or more major programs of the contracting Federal agency." In the case of URA they were engaged to "...perform research and development and to design, construct, manage, operate and maintain a High Energy Physics Laboratory, the Superconducting Super Collider (SSC) Laboratory, and to perform the work and services described in the contract including the utilization of information, material, funds and other property of DOE, and the acquisition, sale, or other disposal of property for DOE..."

Central to a proper understanding of the M&O contract is the decision by the Government to take advantage of private sector expertise rather than develop that capability in the public sector. Given this premise, the following principles provide a framework for the actual contracts:

- The Government retains responsibility for overall program management and project technical direction while the contractor is responsible for the day-to-day management of the work.

- The Government and the contractor have an identity of interest in the mission being pursued.

- The parties intend a long-term close relationship.

- The Government assumes virtually all the financial risk.
- The contractor is hired to manage.
- The contractor broadly supports the performance of Government functions by executing programs of national significance on behalf of the Government.
- The Government is ultimately responsible for security, health and safety and the proper use of public funds.

Part 970 of the DEAR implements this philosophy concerning M&O contracts into actual contractual language. The contract clauses set forth in Part 970 thus establish a framework and a starting point for the actual agreement with URA. The URA contract is consistent with the concept embodied in the regulation, even though the actual contract bears some deviations needed to recognize the special relationship between DOE and URA for the design, construction and operation of the SSC. Each of these deviations was reviewed and approved by the Source Selection Official.

As far as responsibility and accountability of URA, DOE has just concluded a top to bottom review of its M&O contract practices in its Notice of Proposed Rulemaking to 48 CFR Part 970 which is reflected in its Interim Final Rule (IFR) which became effective March 11, 1991. This study was subject to public commentary and rulemaking and culminated in the Interim changes to the DEAR. The amendments were made in order to clarify the responsibilities in the performance of these contracts, and to provide additional incentives to enhance the accountability of M&O contractors to DOE. The new rules, however, are only applicable to profit making and fee bearing M&O contractors. In this regard, the new provisions are not applicable to URA.

Under the IFR, DOE reassessed its policy of providing complete indemnification for non-nuclear risks and concluded not to make this change applicable to non-fee non-profit contractors. Under the IFR it was concluded that certain costs are expenses which a corporation would consider to be a part of the cost of doing

business in its commercial operation and funded from its gross profits, and thus should be unallowable costs under the IFR. One example of these costs includes:

- Direct costs and expenses resulting from damage to government property as a result of contractor negligence where, in effect, the M&O contractor has not provided DOE the skill and expertise for which DOE bargained.

Because of the unique and special relationship associated with most non-profit non-fee contractors, it was determined inappropriate and unfair to apply the same "commercial" standards to their activities.

Based on the foregoing, URA's contract which was consistent with the FAR and DEAR provisions when it became effective on January 18, 1989, remains consistent with current regulations as well.

Mr. WOLPE. Let's turn to the next two sheets and look at the SSC breakdown. Here we find some notable expenses. Some of the more interesting seem to be the following: $12,000 for a Christmas party; $10,000 for a picnic; $3,000 for an anniversary party; $1,000 for supplemental insurance for artwork in the lobby of the laboratory—that's a lot of artwork being insured if $1,000 is the figure; $17,000 for receptions in Ellis County and other communities; and $50,000 for a ground-breaking ceremony.

The contract with URA defines the purpose of management allowance as "in lieu of all general corporate expenses and management services for their work under this contract".

Is this the kind of work DOE wants URA to incur expenses for?

Mr. CIPRIANO. I think in any contract most of these things—maybe all these things—would be considered an allowable charge as far as the overhead of the contract. We do not have such a thing in this contract, and therefore this is our way of dealing with that.

I think you will agree that if you look at the size of the management fee in total, as opposed to the total value of the contract, it is a very small percentage.

Mr. WOLPE. I think that's partly correct, but the reason I understand that DOE went to a management allowance rather than the fee was to exert more control over the elements that went into that so-called fee.

So my question again goes to your notion of the appropriateness. You're essentially saying that these things—you are comfortable with these items.

Mr. CIPRIANO. Yes, sir. We will submit to you the review criteria we use for the record. We have reviewed these and approved them.

Mr. WOLPE. There is one item of particular interest—this will have to be the last question before we recess—with respect to the headquarters discretionary fund. This is detailed on the last pages of the packet.

For fiscal year 1991 headquarters shows $11,000 for Capitol Hill receptions. The justifications for this expense reads as follows: "Annually, in conjunction with URA board meetings, URA hosts receptions in Washington for the purpose of interacting with those in Congress, the Administration, and industry, who are vital to the continued support of URA laboratory programs. These receptions are usually catered in hearing rooms on Capitol Hill. The list of 600 invitees is growing steadily in proportion to the interests in URA being generated by the SSC project."

Does the phrase "interacting with those within Congress, the Administration, and industry who are vital to the continued support of URA laboratory programs" sound something like lobbying to you, Mr. Gibbs?

Mr. GIBBS. No, it sounds to me like it's a matter of keeping individuals informed as to what the activities and progress is of the project.

Mr. WOLPE. Is it appropriate for taxpayer's money to be spent so that URA can use it to get us to spend even more money? Isn't that the real question?

Mr. GIBBS. I think it comes back to the point that Mr. Cipriano made that under a normal situation you would have a manage-

ment fee that would incorporate some of these as normal corporate expenses.

Mr. WOLPE. As I said, we have to recess at this point. I think even though these numbers are admittedly small, it gets to the point of whether DOE is being tough on contractors that are making promises to build something that will come in on cost and with a credible product. It goes to the issue of the kind of confidence we can have in what is about to come down the line.

At that point, we will recess and return in about 10 minutes. Thank you very much.

[Recess.]

Mr. WOLPE. The hearing will resume.

I want to turn now to the question of milestones in the project. Let's look at the project schedule.

I ask unanimous consent to enter into the record at this time a milestone checklist prepared in February of 1990 and January of 1991 by James Decker, director of the Office of Energy Research.

[The referenced publications follow:]

DEPARTMENT OF ENERGY MANAGEMENT BY OBJECTIVES REPORT
FEBRUARY 1990

TITLE. Superconducting Super Collider (SSC)

OBJECTIVE. To construct the Superconducting Super Collider accelerator on schedule and within established estimates of cost, with one-third of the cost of the project from non-Federal sources (foreign governments and the State of Texas).

STRATEGY. The SSC accelerator will be built as part of the new SSC Laboratory at a site near Dallas, Texas. The Department of Energy has selected Universities Research Association, Inc. (URA) to establish the laboratory and to design, construct, and operate this facility. Construction funding for the SSC began in FY 1990. Operation and experiments are expected to begin in 1998. Technical components, including the superconducting magnets, will be fabricated in industry, with substantial development and testing pacing their production. Some magnets, technical components, and detector components may be contributed "in-kind" from other countries. International contributions for construction of the SSC will be solicited by the U.S. Government, with foreign participation in the experimental program an integral part of the plans for the operation of this facility. The State of Texas will provide up to $1 billion and the land on which to site the SSC as part of the non-Federal contributions to establish and operate this world-class high energy physics laboratory.

TASK	TARGET DATE	COMPLETION DATE	REMARKS
1.0 Establish SSC on-site project office	5/90		Interim office established with one full-time secretary and a detailee on-site. Currently writing positions for 4 additional priority staff.
1.1 MA approval of overall DOE-SSC organization	1/90	2/7/90	Completed.
1.2 Memorandum of Agreement with CH on administrative support on-site	1/90	1/11/90	Completed.
1.3 Filling of initial key positions and staffing	4/90		Program Manager position advertised 1/90; expect to receive list of candidates 3/90. Project Manager position establishment request to Exec. Personnel Board mid-2/90; to be advertised 3/90.

TASK	TARGET DATE	COMPLETION DATE	REMARKS
2.0 Final technical & cost baseline approved by DOE	8/90		The site-specific conceptual design completed in draft form late in 1989 indicated design changes compared to the 1986 conceptual design. The associated cost increases caused the Secretary to place certain issues such as the footprint on hold until appropriate reviews were held. The Secretary has now decided to proceed to obtain a new validated cost estimate.
2.1 SSC physics potential reviewed by High Energy Physics Advisory Panel (HEPAP)	1/90	1/12/90	Completed.
2.2 Establish footprint and land acquisition requirements	3/90		Linked with decision to proceed; now expected 3/90. Press release planned.
2.3 Complete Project Management Plan	3/90		Good progress. Office of SSC/SSC Lab negotiations proceeding well and on schedule.
2.4 Complete the site-specific facility design and firm cost estimate	5/90		DOE staff to meet with SSC Laboratory staff in 3/90 to define areas of design and cost estimate which require strengthening prior to validation.
2.5 Review and approve baseline design, cost and schedule	8/90		Laboratory's recommended design, cost, and schedule baseline must be reviewed by ER and Independent Cost Estimating (ICE) Group to result in a validated project with Secretarial approval.
3.0 Complete agreements with State of Texas on best use of its $1 billion contribution	5/90		Draft Memorandum of Agreement (MOA) being prepared and discussed with Texas National Research Laboratory Commission.

TASK		TARGET DATE	COMPLETION DATE	REMARKS
3.1	Establish Policy Group and initial Working Groups	7/89	7/89	Completed.
3.2	Agree on utilization of FY 1990 Texas funds	3/90		Pending release of footprint. SSC Laboratory has withdrawn previous idea of using Texas funding for Magnet Support Facility on Texas land.
3.3	Agree on utilization of future-years funds	5/90		
4.0	Complete Supplemental Environmental Impact Statement (SEIS) process (Record of Decision)	11/90		Drafting of SEIS was initiated in 3/89. CH, ANL, Texas National Research Laboratory Commission and SSC Lab are compiling site data and drafting sections of the document to the extent possible prior to release of final footprint. The footprint is ready to be released following appropriate notifications.
4.1	Confirm footprint with Texas	3/90		
4.2	Issue Draft SEIS	6/90		
4.3	Record of Decision signed	11/90		
5.0	Signed agreements with foreign participants for SSC construction cost sharing	6/91		
5.1	Prepare International Plan describing approach to be taken for obtaining cost-sharing agreements with foreign countries	2/90	2/90	International Plan completed. Met with Secretary, discussed plan, and Secretary informally approved approach.

TASK		TARGET DATE	COMPLETION DATE	REMARKS
5.1.a.	Brief Congress on foreign contributions approach	3/90		Deputy Secretary to brief Congress.
5.2	Determine interest and scope of contributions	12/90		DOE working with SSC Laboratory to identify appropriate areas of contribution and technical approaches.
5.3	Indications of Commitment	2/91		
5.4	Begin formal international negotiations to obtain firm cost-sharing commitments	3/91		Discussions underway with Dept. of State. Start of formal contacts to begin with Deputy Secretary's trip currently scheduled in September 1990.
5.5	Submit, as negotiated, unsigned agreements for Congressional approval (P.L. 101-101)	4/91		
6.0	Demonstrate the feasibility of manufacturing suitable superconducting magnets	9/92		
6.1	"Secretarial Determination" on CICA-7 exemption to restrict competition on Phase II/III magnet industrialization procurement to "domestic" vendors and notification of Congress. Draft RFP approved for magnet procurement.	4/90		Date slippage is due to lack of receipt of draft RFP from SSC Laboratory; now expected 3/7/90. Discussions with IE, OMB, and the Treasury Dept. have indicated that there may be significant problems with our proceeding with the CICA-7 exemption request. Further discussions will help DOE define its position. Laboratory magnet development plan draft was received 2/27/90; currently under review.

TASK	TARGET DATE	COMPLETION DATE	REMARKS
6.2 Issue Request for Proposals (RFP) for prototyping, tooling and preproduction in the Magnet Industrialization Program (MIP)	5/90		Following Secretarial approval, the draft will be released for industry comments before final issuance of the RFP.
6.3 Award contract(s) for Phase II	10/90		
6.4 Finalize basic magnet specifications	11/90		
6.5 Start full-length magnet prototype fabrication in industry	1/92		
6.6 Start initial tunnel sector	9/92		Follows decision to commercially produce collider dipole magnets.

for James T. Decker
Acting Director
Office of Energy Research
(202) 586-5434

3/7/90
Date

SUPERCONDUCTING SUPER COLLIDER

January 15, 1991

Department of Energy
John C. Tuck 586-6479
James F. Decker 586-5434
Garry W. Gibbs 353-3476

Objective:

To successfully construct the Superconducting Super Collider (SSC) accelerator on schedule and within established estimates of cost, with a goal of one-third funding from non-Federal sources (foreign governments and the State of Texas).

Strategy:

The SSC accelerator will be built as part of the new SSC Laboratory at a site near Dallas, Texas. Universities Research Association, Inc. (URA) has been selected to design, construct, and operate this facility and to establish the SSC Laboratory. Construction funding for the SSC began in FY 1990, with operations and experiments expected to begin in 1999. The superconducting magnets and other technical components will be fabricated in industry; development and testing will pace production. Some magnets, technical components, and detector components may be contributed "in-kind" from other countries. Foreign participation is also planned in the experimental program. The State of Texas will provide up to $1 billion and land for the SSC.

Critical Milestones	Completion Date	Due Date
Completed (Prior Quarter)		
Final technical and cost baseline approved by DOE	Nov. 90	May 90
Complete agreements with State of Texas on best use of their $1 billion contribution	Nov. 90	June 90
Planned (Next Quarter)		
Complete Supplemental Environmental Impact Statement (SEIS) process (Record of Decision)	Jan. 91	Oct. 90
Complete Project Management Plan	Jan. 91	Dec. 90
Planned (Longer Term)		
Complete agreements with foreign participants for contributions to the SSC		June 91
Demonstrate the feasibility of manufacturing suitable superconducting magnets		Sep. 92

Assessment of Progress

During this past quarter, the Memorandum of Understanding between the State of Texas and the U.S. Department of Energy was executed, reflecting the principles of agreement regarding the relationship among the DOE, the Texas National Research Laboratory Commission, the Universities Research Association, Inc., and the SSC Laboratory in connection with the siting, development, construction, and operation of the SSC in Ellis County, Texas. For FY 1991, Texas has allocated $149 million in support of the SSC project.

The Department's cost and schedule baseline for the SSC project was established and discussed with OMB. The Department's baseline report is still pending clearance for forwarding to Congress. The Project Management Plan, which includes levels of approval required for any changes to the baseline, is in final draft with completion expected in January 1991.

All comments received during the public comment period on the SEIS have been incorporated and the final SEIS was released on December 21, 1990, with a Record of Decision expected on January 28, 1991.

The industrial team of General Dynamics and Westinghouse Electric Corporation was selected in October to enter into negotiations for contracts for completing the design and beginning high-volume manufacture of superconducting collider dipole magnets. Definitive awards are expected in February 1991.

James F. Decker
Acting Director
Office of Energy Research (202-586-5434)

1/5/91
Date

Mr. WOLPE. This is a milestone checklist.

If you look at this memo by Mr. Decker, all the critical milestones slipped past their due dates, some not by much, but when there is a very tight schedule, as we have discussed earlier, there's not much room for slippage.

There is one discrepancy between the February 1990 and the January 1991 sheet that I would like to raise. On page two of the November sheet the due date for the project management plan is listed as 3-90. The February memo lists it as 12-90. Why did it take so long to get out the management plan?

Mr. CIPRIANO. The project management plan—there were versions of it, of course, in existence well before the date it was finally signed. It is a very, very complete document that reflects probably much more stuff than is included in a project management plan. It defines responsibilities, it defines major milestones, it defines funding profiles, it defines cost down to WBS level 3, it defines top level technical characteristics, it defines systems engineering procedures, safety and environmental health procedures, et cetera. What we wanted to do was make it a very strong document that was accepted by all the parties associated with the program—the Universities Research Associates, the laboratory, Texas National Research Laboratory Commission, the Department of Energy at all levels, et cetera.

So it took a while to get the final version of it signed by all those people. However, the principles represented in that plan were in effect many, many months before the final document was signed.

Mr. GIBBS. Let me add, if I may, that another factor that impacts both your earlier comment and observation on the milestone as well as the project plan—between these dates we've been doing the baseline report—we've been doing the review, looking at the schedule, and developing the baseline report. So some of these milestones are related to that and we have purposely put on hold for awhile finishing the project management plan, until we had a schedule and a baseline we were working with.

Mr. WOLPE. Let me say that I have no quarrel with the rationale. But again, the point is that you did have to shift schedule, and not meet milestones, in order to do the work properly. That is the issue of the appropriateness of the schedule that's in place for the accomplishment of all the available tasks that is really raised by the history of the missing of milestones up to this point.

That's the only point I'm trying to make here. It is not a questioning of your competence or judgment. These are decisions you had to make. That's the point almost.

Mr. GIBBS. Yes.

Mr. WOLPE. Let me ask about another critical area, the magnet program. On page five of the February 1990 memo sets the target date for issuance of the RFP as May 1990. When did the RFP for the dipole magnets go out?

Dr. BUSH. I believe it actually came out in August, 8-90.

Mr. WOLPE. When did the RFP for the quadrupoles go out?

Dr. BUSH. Oh, gee, 60 days ago. What are we—May, February, March—early March I guess.

Mr. WOLPE. The next milestone calls for the contracts to be awarded by October 1990. When were the contracts completed and signed?

Dr. BUSH. The contracts are completed and signed, and will be done by the end of this month.

Mr. WOLPE. So they are not yet completed and signed?

Dr. BUSH. They are signed by the lab. They are in review at DOE, as Garry Gibbs said earlier, in the final review. I believe that's a 10 day process or something.

But 4-91 is the date when the actual final award will be done.

Mr. WOLPE. Okay.

Dr. BUSH. In the meantime——

Mr. WOLPE. Finally, according to page four of the February 1990 memo, negotiated unsigned agreements on foreign participation were supposed to have been submitted by April 1991. That didn't happen, did it?

Mr. GIBBS. That's correct.

Mr. WOLPE. The January 1991 memo slips the date to June 1991. Will you meet that deadline?

Mr. GIBBS. We will probably not have any formal agreement signed by the June 1991 time frame other than maybe possible agreements in principle or some sort of statements of agreement.

Mr. WOLPE. I'm almost done with this line of questioning, and then I want to yield to Mr. Geren so he can get his five minutes in.

I ask unanimous consent to introduce into the record at this time an April 19, 1990 memo from Mr. Tom Bush to other members of the magnet division. In that memo Mr. Bush lays out major project milestones.

[The referenced memo follows:]

Hale
Jayakumar
Martin
Massey
Pennington
Zbasnik

Magnet Systems Division

Superconducting Super Collider Laboratory
2550 Beckleymeade Avenue, Suite 240, MS-1000
Dallas, TX 75237-3946

all section labs

MEMORANDUM

To: ALL MAGNET PERSONNEL

From: T. Bush

Date: April 19, 1990

Subject: SSC Major Project Milestones (MPM)

Attached are the Laboratory Major Project Milestones. All planning and costing shall be consistent with the MPM dated 4/7/90--unless changed by me.

/mak

Attachment

cc: H. Edwards

AFD: BUSH Storage/MPM(M)4-19-90

MAJOR PROJECT MILESTONES
Superconducting Super Collider
(4/7/90)

		DATE	
M1-1	A/E Award	May	90
M1-2	Baseline Validation Complete	Jul	90
M1-3	Collider Dipole Magnet [CDM] Contract Award	Aug	90
M1-4	SEIS Record of Decision	Nov	90
M1-5	Start SSC Construction [Ground Breaking]	Jan	91
M1-6	Collider String Test Complete ~~Industry Prototypes~~ Industrially assembled magnets	Oct	92
M1-7	Start first Sector CDM Delivery	Oct	93
M1-8	Begin Excavation of Experimental Halls	Mar	93
M1-9	First Collider Sector - Start Installation of Major Components	Jan	94
M1-10	Linac - Start Commissioning	Oct	94
M1-11	First Sector - Start Cool Down	May	95
M1-12	MEB - Start Commissioning	Oct	95
M1-13	Beneficial Occupancy of Large Experimental Halls	Oct	95
M1-14	HEB - Start Installation	Jan	96
M1-15	MEB - Test Beams Available	Apr	96
M1-16	HEB - Start Commissioning	Oct	97
M1-17	Detectors - Start Commissioning	Mar	98
M1-18	SSC - Start Commissioning [Beam]	Jul	98
M1-19	SSC - Complete Commissioning Beams to Experiments	Oct	98

*Sequence of milestones is such that slip in any of the early milestone (e.g. SEIS ROD) results in at least day for day slips in subsequent milestones.

Mr. WOLPE. What I'm interested in is the note at the bottom that says, "Sequence of milestones is such that slip in any of these early milestones—for example, SEIS record of decision—results in at least day for day slips in subsequent milestones."

Dr. Bush, I assume that is still your judgment and this affirmed by your colleagues.

Dr. BUSH. Do you mean that final sentence?

Mr. WOLPE. Yes.

Dr. BUSH. No. That was my perception of the program at time based on where we were and what we were trying to accomplish, but it is not necessarily my judgment right now.

Mr. WOLPE. Okay.

Dr. BUSH. The ones that were important to me, of course, on that memo were M-107——

Mr. WOLPE. And in fact, I believe——

Dr. BUSH [continuing]. And M-111.

Mr. WOLPE. So you are essentially saying that because the baseline report has been so altered that now you are more comfortable with where you are at.

Dr. BUSH. You have that correct.

Mr. WOLPE. By the time the baseline report was prepared, the Government had committed, of course, over $500 million to this project based on previous milestones and assurances. So I hope you understand, at least, the reason for our raising of these questions now as to why we should have much great confidence in——

Mr. CIPRIANO. There are different levels of milestones. There have been no slippage of any top level milestone in the program. The laboratory and Department of Energy at different levels establishes many, many tiers of milestones so that we can trigger corrective action when we put at risk something that is important.

Mr. WOLPE. In the memo that I was referring to a moment ago, the characterization of the milestones that are listed are critical milestones. There may be more critical milestones. My only point again is that the tightness of the schedule makes this a very important——

Mr. GIBBS. But at each level of the project you can find critical milestones. What Joe is referring to is the top level to determine whether we're going to meet our overall schedule.

Mr. WOLPE. Thank you.

Mr. Geren, please.

Mr. GEREN. Thank you, Mr. Chairman.

I'm going to ask you to comment a little on some of the efforts that are underway to secure foreign participation, but just make one observation. These sort of hearings are certainly necessary and I don't question their validity. We need to continue to oversee this and make sure our taxpayers—we taxpayers—are getting our money's worth. I know you're committed to that same goal.

Unfortunately, there are people in Congress who, in spite of the decision of Congress, and in spite of the majority feeling in Congress that we go over this project, have not relented in their efforts to kill the project and we're working across purposes with ourselves. If we have people in Congress trying to kill it, at the same time we're out trying to tell other countries, "Invest in our

project," we're working against ourselves. That's a concern that I have as we move forward.

I know last year the State of Texas asked Congress, "Congress, if you cancel this program, can we get our money back?" Congress said, "No, you can't. That's just a risk you're going to have to take."

Considering our record in Congress on that point, I can see why it's difficult to go out and sell this project until we have finally put to rest the issue, "Are we moving forward with this project, or are we not?" Again, the majority of Congress is convinced that we are. A small, small minority continues to think that they can torpedo this project, and I think it's standing in the way of our efforts to truly market this thing on an international scale.

The President met recently with the Prime Minister of Japan, and I understand he has made an overture to them. He personally asked their participation in this. Can you talk about where things stand with Japan and what kind of progress we are making on that front, in spite of the hurdles that we in Congress have put in your way?

Mr. GIBBS. We can confirm that the President did talk with Prime Minister Kaifu a few weeks ago, and subsequently we've had Dr. Jim Decker from the Office of Energy Research over in Japan. On the basis of interactions there as well as sort of a level of discussion and activity we're quite encouraged that the Japanese government at all levels, really, are looking at this at this moment and looking at it from the point of view of to what extent and how they might participate and what mechanisms might be needed in their country and in their structure to participate. We're quite encouraged at this point.

Mr. GEREN. Do you have any idea of what level—if we are successful in securing their participation—that they would be interested in participating?

Mr. GIBBS. I don't think we have a specific of that nature. Certainly from a point of view of capability that they have the components and the materials that they could contribute, it would be significant. It's a matter of what level.

We have talked to them about the $1 billion or higher level.

Mr. CIPRIANO. I can identify over $2 billion worth of services and products that they are capable of providing for this project.

Mr. GEREN. Let me just ask that we clear up one last point, lest there be misunderstanding about this issue of $500 million in operating expenses. I also serve on the Public Works Committee, and we build buildings. We have one account in which we put all the costs of building that building, and then there are operating expenses which go in another account. These operating expenses—the building would be worthless without them. It would be worthless without electricity, it would be worthless without security, it would be worthless without a number of these services the operating expenses cover.

I don't see any real distinction between that type of undertaking by Government and what we're talking about now. For us to suggest that we need to lump all the operating expenses into the total cost of this project, not treat them separately, is inconsistent with

the way we handle most other Government investments. I don't think anything that we have——

Mr. WOLPE. If the gentleman would yield, that is certainly not my intention, nor do I think it is in the operating premise of the way we've approached that question at all.

Mr. GEREN. I guess I misunderstand it. It seems to me that what we have suggested throughout the last couple of hours of this hearing is that these operating expenses ought to be considered in the——

Mr. WOLPE. No, what we're suggesting is that what is not being termed operating expenses ought more properly be in fact subsumed in the total project cost. That is the question here.

Mr. SISKIN. I would very much disagree with that, sir.

Mr. WOLPE. I understand that.

Mr. SISKIN. On the basis that what we're talking about is exactly what Mr. Geren is talking about.

Mr. GEREN. I would contend that from the information we brought forward today, it in no way establishes that there are costs of constructing the superconducting collider that should be included in that total that have not been included in it up until now. Nothing that this hearing has shown has shown that in any way have the costs been under-represented by you or the Department of Energy.

Mr. WOLPE. Would the gentleman yield further?

Mr. GEREN. Certainly.

Mr. WOLPE. I think it's a useful kind of point that is being made here. There is a distinction to be made, I would submit, between the kinds of operating costs that will be incurred once you have a facility built and functional and that clearly are separate operational costs into the future. And those costs that are being termed operational, but which in fact by everyone's internal statements must be built in at this point, even in advance of the construction of the project.

I never heard it suggested—they are linked to the construction. You would not invest in the laboratory, you wouldn't have it accelerated without the laboratory—there is a piece of this that goes to this question of what is a legitimate part of the total project cost calculation.

Secondly, I don't want to suggest that the issue of operational costs is not an issue in and of itself because one of the real questions here is the size of the operational cost in the future and the dangers they may squeeze out because they are overspending 5 percent, at this point, of the total budget now allocated for other accelerated work and other operational kinds of expenditures.

But that is a separate question. I just wanted to clarify the two different issues.

Mr. GEREN. I appreciate the clarification.

Mr. Gibbs?

Mr. GIBBS. If I could just, again, from a point of view of clarification, if you went down to 1999 and looked back and what did it take for me to build the SSC to make it an operational facility, any costs associated with operations to do that are in the TPC. It's those costs that are outside those activities that are directly related to the cost of building the SSC that would not be incurred if this

were being built at some other laboratory that are not in the TPC. Those will be provided out of other high energy program funds, as they are for other laboratories.

Mr. GEREN The method you have used to allocate expenses and costs is consistent with the way our Government does business, as I understand it, and that we have not tried to slip anything under the rug by trying to characterize it in any way other than is generally accepted in the Department of Energy and as any other agency of our Federal Government would do. Would you agree with that?

Mr. GIBBS. Yes. What we're dealing with here, a prime example—this is a green field site. We are doing two things. We are building the SSC and we're establishing a laboratory. The most immediate comparison is the CEBAF project in Virginia where we are doing the same thing. There are total project construction costs associated with that and there are other program costs that are not part of the Total Program Cost of construction that are available to that facility.

So we're not singling out or treating the SSC any differently than that project is being treated.

Mr. GEREN. All right.

Thank you, Mr. Gibbs.

I yield back the balance of my time, Mr. Chairman.

Mr. WOLPE. Thank you, Mr. Geren.

Mr. Barton, would you like to take some time—I'm going to ask of you—we have a vote on.

Mr. BARTON. We have another vote?

Mr. WOLPE. Yes.

Mr. BARTON. They just told me that we were having no more votes today.

Mr. WOLPE. I misunderstood. But in any event, we have to be out of here by 2:30.

Mr. BARTON. I'm a little bit late because Congressman Boehlert bought me a hot dog in the member's cloakroom and tried to delay me from getting over here. [Laughter.]

Mr. BOEHLERT. I took it out of the contingency fund. [Laughter.]

Mr. BARTON. Did Congressman Geren elaborate any on the foreign participation in his questions? Did you talk about the Japanese?

Mr. GEREN. I did ask them to give us an update on the progress with the Japanese.

Mr. BARTON. Okay.

It's my understanding that President Bush has in fact met with the Prime Minister of Japan, Prime Minister Kaifu and has talked about the SSC directly. It's also my understanding that as a direct consequence of that meeting, Secretary of Energy Watkins last Thursday, I believe, met with a high Japanese official here in Washington to discuss their direct participation. And it is also my understanding that as a result of that meeting, Deputy Secretary Henson Moore is expected to be in very serious negotiations in the next several months. Is my understanding correct or incorrect?

Mr. SISKIN. It's correct.

Mr. BARTON. Congressman Boehlert raised some very—I thought—legitimate questions about the participation of our Euro-

pean partners. It's my understanding that CERN, the high energy physics facility in Geneva, Switzerland, is in fact a European collaborative effort of I believe 14 European nations that was established directly in response to a fear by the Europeans in the mid-1950s that the United States of America was becoming dominant in high energy physics.

It is also my understanding that as a result of that collaboration, they are contemplating building what I believe has been referred to as an LHC—the large hadron collider—which would be to some sense a competitor to the SSC. It is also my understanding that the director of that laboratory, Nobel Prize winner Carlos Rubia, is still trying to get the European nations to put their additional funding into that, but it is my understanding that he is not being successful. Is that correct or incorrect?

That's a lot of my understandings, but is it safe to say that the Europeans are at least thinking about building a mini-version of the super collider, and until they have decided against that, it's unlikely that they're going to come forward to participate with the United States and the SSC.

Mr. GIBBS. Yes, I think that's fair.

Mr. BARTON. With regard to the Russian participation, there is an experiment at CERN called the L3 detector. It is basically an American operation, but they have encouraged the Russians to become involved in that. And I believe the Russians actually provided the crystals for that detector and much of the iron work—if I'm using that phrase correctly. So that if in fact the Russians determine at some date to become involved in the SSC, there is a high degree of confidence that their contribution will be meaningful.

Is that fair to say?

Mr. GIBBS. Yes.

Mr. BARTON. I guess the last point I would try to make—before I became a congressman, I was trained as an industrial engineer, I have a masters degree in industrial administration, and we learned about a production technique called critical path scheduling where you try to do several things simultaneously. The critical path element is that path which without it the project cannot be completed and everything has to stop. I was taught that critical path scheduling was a good thing because it shortened time frames, it saved money, and it allowed several things to go on simultaneously. Is that what the GAO report is talking about when they talk about concurrent operations?

Dr. BUSH. Probably with respect to the magnets, that may be the way they interpret it. As you well know, we have laid out a schedule to get us to the production magnet as quickly as we can, based on a prudent number of evolutions of the design and testing.

Mr. BARTON. But you're doing several things simultaneously.

Dr. BUSH. Of course we are.

Mr. BARTON. The end result will be that when it all comes together with proper safeguards for testing and cost accounting, we're going to have a successful magnet.

Dr. BUSH. We're not worried about having a successful magnet. We'll have one.

Mr. BARTON. Okay.

It's 2:30, Mr. Chairman. I am going to yield back. I want to compliment you for this hearing and thank you for your courtesy in allowing me to participate. I think many of the questions that have been raised by yourself and others are questions that those of us that support the program have been raising all along. We are more than happy to see them elevated in the public arena because the end result will be a tighter run program that does meet the goals. The goal of the SSC is to make the United States of America preeminent in high energy physics in the 21st century.

Mr. WOLPE. Let me thank you very much, Mr. Barton, for that comment. I think that your presence here and that of your colleagues has been very helpful to the process itself. I welcome your participation today.

Let me yield now to my distinguished ranking member for a concluding statement.

Mr. BOEHLERT. Thank you very much, Mr. Chairman.

I think there are still many, many questions that have to be asked, but time has sort of slipped away. I think we've established some things today. One, that we have no significant contributions from any foreign government despite 4 years of promises that they will come. We have spent almost $600 million of our own money, and only India is on board, but to date we are paying rather than the Indians. There is confusion within the Department about whether the foreign contributions will come in-kind or in cash, and that affects the accounting of the total project cost.

Your insistence that we focus on total project cost is reminiscent of an old Humpty Dumpty line. "The word means just what I say, nothing more, nothing less." That's fine, but as far as the taxpayers are concerned, there is a lot more, and we have to be concerned about the total taxpayer cost as well as the total project cost.

It looks to me, at this juncture in the proceedings, that we have established the fact that we are over $9 billion—at least from this side of the hearing room—in cost. I'm really concerned that it's going to escalate even further. So we're going to be delving more into this as time goes on.

I want to thank all of the witnesses for their cooperation. I want to thank our Texas colleagues for their spirited and significant contribution, and let me close by saying that I was glad I bought you the hot dog. [Laughter.]

Thank you.

Mr. BARTON. I may regret that. [Laughter.]

Mr. WOLPE. Thank you very much, Mr. Boehlert.

First of all, during the course of the subcommittee's investigation, we exchanged correspondence with the Department of Energy on the subject of subcommittee procedures for interviewing Federal agency personnel.

I ask unanimous consent that this correspondence be entered into the hearing record at the appropriate place.

[The referenced correspondence follows:]

U.S. HOUSE OF REPRESENTATIVES

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

SUITE 2320 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-6371

March 8, 1991

The Honorable James D. Watkins
Secretary
Department of Energy
Washington, D.C. 20585

Dear Mr. Secretary:

The Subcommittee on Investigations and Oversight is responsible to the Science, Space, and Technology Committee, the U.S. Congress and the public for exercising proper review of all programs within the Committee's jurisdiction, including the proposed Superconducting Super Collider (SSC). Accordingly, the Subcommittee last week requested, through your office of Congressional Affairs, an interview with the head of the Independent Cost Estimating (ICE) staff. In discussing the conditions of the interview, the Department's officer for House Congressional Relations stated that it is Department policy that interviewees may bring one person of their choice to any interview.

We must reject any attempts by the Department to set the terms under which this Subcommittee will fulfill its oversight responsibilities. Our right to interview Department employees without interference is inviolable. This right is firmly supported by the precedents of the House of Representatives and by established legal principles.

The reason for our insistence on an interview without Department officials, who have an inherent conflict of interest, should be self-evident in this case. The Department commissioned three independent cost estimates for the SSC. One of those was prepared by the Department's ICE staff. It is incumbent upon this Subcommittee to learn the basis for the ICE staff's estimate in the same spirit in which it was commissioned — that is, independent of outside influence or pressure.

For that reason, we must insist that the Department abide by the precedents of the United States Congress and this Subcommittee, rather than the Department's internal policy, and make Robert Scarlett, the head of the ICE staff, available for a private interview with the Subcommittee staff, accompanied by no one other than his personal attorney, if he wishes.

We wish to emphasize that in many cases where the Subcommittee does not see a potential conflict of interest arising from the presence of a Department official, the Subcommittee may allow Department officials to attend the interview. However, as stated earlier, our right to interview Department employees without interference is inviolable. This policy applies to all departments and agencies within our jurisdiction. Interviewees may, of course, freely discuss the interview with anyone they choose.

Based on the foregoing, we request that the Department schedule the interview with Mr. Scarlett to take place in the Subcommittee's offices no later than March 20th.

As Chairman and Ranking Republican of the Investigations and Oversight Subcommittee, we are dedicated to exercising our responsibilities vigilantly and with great care for the public's interests. We know you share this devotion to public service. Accordingly, we look forward to the Department's compliance with the requests stated above.

Thank you for your attention to this matter.

Sincerely

HOWARD A. WOLPE
Chairman
Subcommittee on Investigations
and Oversight

SHERWOOD BOEHLERT
Ranking Republican
Subcommittee on Investigations
and Oversight

HW/SB:Ssw

Department of Energy
Washington, DC 20585

March 22, 1991

The Honorable Howard A. Wolpe
Chairman
Subcommittee on Investigations
and Oversight
Committee on Science, Space,
and Technology
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

Admiral Watkins has asked that I acknowledge receipt of your letter of March 8, 1991, which brought to his attention the Subcommittee's wish to arrange an interview with Mr. Robert Scarlett, who had directed staff efforts in connection with the Independent Cost Estimating Review of the Superconducting Super Collider. We have consulted with Mr. Scarlett, and he has no objection to meeting with the Subcommittee staff without accompaniment.

It may be helpful as well for me to clarify the Department's policy regarding accompaniment at staff interviews, to which your letter referred. The Department does not, of course, seek to set the terms under which the Subcommittee may choose to carry out its work. Instead the policy is directed only to describing the rare circumstances under which an employee need not feel obliged by Departmental policy to agree to such an interview. Those circumstances arise only when a subcommittee staff refuses to accommodate a reasonable request, based solely on the employee's personal wishes, that the employee be accompanied at an interview by an individual of his or her own choosing. This policy was adopted by the Secretary after instances where other subcommittee staff members conducted interviews of Departmental employees in an abusive, threatening and coercive manner.

As far as the Department is concerned, its efforts in formulating cost estimates for the Superconducting Super Collider are an open book for the Subcommittee to examine. As you know, the Department has made available to the Subcommittee extensive

written reports setting forth the analysis employed in these efforts. We will also be pleased to arrange to make Departmental officials available to the Subcommittee and its staff at mutually agreeable times in order to aid the Subcommittee in its inquiry.

Please do not hesitate to let me know if the Subcommittee requires any additional assistance in this matter.

Sincerely,

Jacqueline Knox Brown
Assistant Secretary for
Congressional and
Intergovernmental Affairs

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COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUITE 2320 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-6371

May 9, 1991

The Honorable James D. Watkins
Secretary
Department of Energy
Washington, D.C. 20585

Dear Mr. Secretary:

As you know, the Subcommittee on Investigations and Oversight of the Science, Space and Technology Committee, pursuant to its authorities under Rules X and XI of the United States House of Representatives, has been reviewing the Department of Energy's proposed Superconducting Super Collider (SSC) program. On March 20, 1991, as part of this review, a staff interview was conducted with Mr. Robert Scarlett, the head of the Independent Cost Estimating (ICE) staff, to determine the basis for its cost estimate for the SSC.

During the course of arranging for that interview, the Department of Energy's Congressional Affairs office advised that it is Departmental policy that interviewees may bring one person of their choice to an interview. In our letter to you on March 8, we made it plain that it is the policy and practice of this Committee, consonant with the constitutional oversight prerogatives of the House of Representatives, to set the ground rules for its investigatory proceedings, including the manner in which the staff interviews of agency officials will be conducted. As we explained, the inherent potential for conflict of interest arising from the presence of a Department official, as well as the possible inhibiting effects of such a presence, underlie this policy. But we noted that interviewees may be accompanied by a personal attorney. Mr. Scarlett chose to attend alone, in apparent acknowledgment of the Subcommittee's policy.

However, on March 22, 1991, we received a letter from Ms. Jacqueline

Knox-Brown, Assistant Secretary for Congressional and Interagency Affairs, indicating a continued insistence on the Department's rejected stance. As a consequence, we feel compelled to set forth concisely the pragmatic and legal rationale for the Subcommittee's overriding policy.

The ability of the Subcommittee to effectively carry out its oversight responsibilities requires that it be confident that the responses it obtains from officers and employees with respect to the administration of agency programs are candid, objective, and truthful. We have no way to ascertain with any degree of certainty whether any interviewee's particular request to be accompanied by Departmental personnel is, in fact, "based solely on the employee's personal wishes." Our policy, then, seeks to insulate an interviewee from presence of departmental personnel during a staff interview and stems from our desire to assure effective oversight of Departmental operations while protecting interviewees from the possibility of abuse, threats, and coercion.

The legal basis to ensure the effective accomplishment of the Subcommittee oversight responsibilities is unassailable. It has been deemed axiomatic that "[a] legislative body cannot legislate wisely or effectively in the absence of information regarding conditions which the legislation is intended to affect or change." McGrain v. Daughtery, 273 U.S. 135, 175 (1927). In a variety of contexts, the Courts have recognized that the "power of inquiry – with process to enforce it – is an essential and appropriate auxiliary to the legislative function." Id. at 174. As a consequence, "Congress, whether as a body, through committees, or otherwise, must have the widest possible access to executive branch information, if it is to perform its manifold responsibilities effectively." Murphy v. Department of the Army, 612 F.2d 1151, 1158 (D.C. Cir. 1979). For that reason, "'[t]he scope of the [Congressional] power of inquiry . . . is as penetrating and far-reaching as the potential power to enact and appropriate under the Constitution.'" Eastland v. United States Servicemen's Fund, 421 U.S. 491, 504 n.14 (1975) (quoting Barenblatt v. United

States, 360 U.S. 109, 111 (1959)).

Thus, Congress has been vested with broad, constitutionally based oversight powers to ensure that public officials remain accountable to legislative scrutiny to allow it to see whether its laws are being fully executed. Watkins v. United States, 354 U.S. 178, 187 (1957). Moreover, through the enactment of specific statutes, it has sought to protect the rights of public employees to communicate with Congress and provide information and materials to the Members and Committees of Congress. Experience has demonstrated that government employees who feel free to provide evidence at public fora are essential tools of government accountability. Congress in the past had proscribed "gag orders" forbidding federal employees from directly communicating with Congress without seeking the approval of their supervisors and guaranteed the right of civil servants to freely communicate with elected representatives. The Lloyd-LaFollette Act, 5 U.S.C. S 7211, provides that:

> The right of employees, individually or collectively, to petition Congress or a Member of Congress, or to furnish information to be Committee or Member thereof, may not be interfered with or denied.

Also, in the Civil Service Reform Act of 1978, Congress again emphasized its need for a free flow of information from the Executive Branch by making it unlawful to take reprisals against so-called "whistleblowers." See 5 U.S.C. S 2302(b)(8). The Senate Report declared: "Protecting employees who disclose governmental illegality, waste, and corruption is a major step toward a more effective civil service. In the vast bureaucracy, it is not difficult to conceal wrongdoing provided that no one summons the courage to disclose the truth." S. Report No. 969, 95th Cong., 2d Sess. 8 (1978). In 1988 and 1989, Congress further strengthened the protections of whistleblowers. See Military Whistleblowers Protection Act, P.L. 100-456, S 846, 102 Stat. 1918, 2027-30 (1988), codified at 10 U.S.C. S 1034; and the Whistleblowers Protection Act of 1989, P.L. No. 101-12, 103 Stat. 16.

Finally, Congress has made it a violation of federal criminal law to impede a Congressional investigation or intimidate Congressional witnesses. See 18 U.S.C. S 1505 and 1512(b)(c).

We are confident that you are sensitive to the need to follow both the letter and spirit of these important statutes and case precedents and understand their close relationship to the requirements of uninhibited Subcommittee access to departmental personnel. Further insistence on the Department's interview policy, with its potential damage to and chilling effect on continued cooperation of department employees with current and future Subcommittee inquiries, poses the threat of an unnecessary obstacle to what heretofore has been a productive relation. Certainly the option afforded any interviewee of requesting the presence of a personal attorney sufficiently protects the interests of the interviewees and satisfies any perceived obligation of the Department.

We appreciate your cooperation in this matter and look forward to working with you in the future.

Sincerely,

HOWARD WOLPE
Chairman
Subcommittee on Investigations
and Oversight

SHERWOOD BOEHLERT
Ranking Republican
Subcommittee on Investigation
and Oversight

Mr. WOLPE. Let me just say in conclusion—first of all, what is not at issue here is either the sincerity or the determination of those of you participating in the project and trying to make things right. What is at issue is that a lot of decisions have been made with respect to how to calculate the cost with respect to schedule, with respect to engineering, and planning, that I think raise some very serious questions, which we have discussed in some depth in the course of this hearing.

I think there has been a very premature rush to decision here, and without an awful lot of questions being answered in advance that should have been properly answered in advance. So I do think there are a lot of problems that really emerge because of the way in which this thing is being rushed to judgment at this point.

We will be sharing our findings with the members of the Appropriations Committee. We hope that what we have dealt with at this point will be useful and that deliberations will take place both in appropriations and in the Congress generally.

We will continue our efforts in oversight in the weeks and months ahead. I want to thank all of you for your cooperation and assistance and making yourselves available for such an extended period of time for this committee. We're most appreciative.

Thank you very much. This hearing stands in recess.

[Whereupon, at 2:34 p.m., the committee adjourned, to reconvene at the call of the Chair.]

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